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MONTHLY REPORT

OF THE

DEPARTMENT OF AGRICULTURE,

FOR

FEBRUARY AND MARCH 1875.

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MONTHLY REPORT.

DEPARTMENT OF AGRICULTURE,
STATISTICAL DIVISION,
March 27, 1875.

SIR: The statistical report of the present month embodies statements of local preferences for material in soil-fertilization, of the products employed in feeding and fattening animals, the length of time and cost of winter-feeding, the local surplus and local deficiencies of crops; a statement of the production of tobacco in 1875, its quality and value; a record of minor official statistics; current market-prices of products in this and other countries; and bulletins of the work of other divisions of the Department of Agriculture.

J. R. DODGE,
Statistician.

Hon. FREDERICK WATTS,
Commissioner.

STATISTICAL RETURNS FOR MARCH.

The March circulars sent to our statistical corps, which now represents 1612 counties, including nearly all of the producing area of the country, are of a miscellaneous character, and not repeated annually. It was deemed desirable to obtain a statement of local preferences for fertilizers and modes of soil-fertilization, and also of the kinds and proportion of products for feeding and fattening animals, the length of time and cost of feeding in winter, and some facts indicative of the local surplus and local deficiencies of the different crops. The following list of questions was very generally answered in the returns which were received from 1096 different counties:

1. What fertilizers are used in your county? What proportions of such fertilizers are farm-yard manures? home-made composts? commercial fertilizers? Are the latter deemed profitable?

2. What proportion of hay-fields are usually in clover? what in cultivated grasses, and principally of what kinds? what in native or wild grasses? Is green-manuring with clover practiced? If so, is the full crop, the second growth, or only the stubble turned under? Please state the practice and its results in soil-improvement; specific and significant facts desired, rather than general views.

3. Number of months in the year in which domestic animals are fed exclusively? Number of months in which partial feeding supplements pasturage? and what are the principal kinds of forage used, and proportions of each? Is grain fed to animals? If so, when, how liberally, and to what kinds of stock? What proportion of your corn-crop is consumed in the county?

4. What is the cost per head, in cash-value, of forage, for wintering horses? milch cows? sheep? What is your estimate of the average value of each of these classes of stock in autumn? in the spring? Is there an average increase of weight during the winter, or decrease? and how much of either?

5. What percentage, if any, of the value of your crops is sold to go out of the county? What is the leading crop thus sold? What proportion, if any, of your farm-animals is sold to go beyond the county?

6. What products of agriculture are brought into the county for consumption, and what percentage of the home consumption? What farm-animals, if any, are brought from abroad, and to what extent?

7. Has your county derived any advantage the past year from association and co-operation, in marketing crops, or in procuring supplies? If so, can you give an approximate estimate of the aggregate sum thus saved? Individual facts in this connection will be acceptable.

LOCAL PREFERENCES FOR FERTILIZERS.

The investigation demonstrates the fact that farmers are learning the necessity of increasing the store of plant-food in the soil, of having it in an immediately available form, and of supplementing notable deficiencies with specific fertilizers. They are becoming better versed in the philosophy of fertilization, and better able to adapt their practice to the peculiarities of their soils, and to their local resources in material for fertilization, both by an increase in theoretical or scientific knowledge and in experience gained in successful application of such acquirement. Not all are thus intelligent; a large proportion yet see by the dim light of tradition, and follow only methods found successful in their personal observation, often with little regard to differing circumstances of soil and situation. It is true, nevertheless, that the average practice of these practical men is essentially sound, and really based on reason and science.

Though half of the counties in the United States are cultivated almost literally without fertilizers of any sort, and another fourth with the casual aid of green manuring, or a little lime, or plaster, or cotton-seed, or a "cow-penned" lot, or some trifling saving of farm-yard manure, it is still true the practice of systematic fertilization is increasing. It is not only increasing, but is followed with a better adaptation of means to ends, and with a superior economy in the choice of material.

"What fertilizers are used in your county?" The following table, which gives the proportions of farm-yard manures and other fertilizers, presents the average of the returns of each State, and doubtless with sufficient accuracy for the purposes of the investigation, of the true averages of all the counties of the several States. In examining the figures it must be remembered that they indicate percentages of whatever fertilizers may be actually employed, however small in quantity or unimportant in value, which are almost too insignificant for estimate in the States west of the Alleghanies:

States.	Farm-yard manure.	Other fertilizers.	States.	Farm-yard manure.	Other fertilizers.	States.	Farm-yard manure.	Other fertilizers.
	P. ct.	*P. ct.*		*P. ct.*	*P. ct.*		*P. ct.*	*P. ct.*
Maine	73	27	North Carolina	51	49	Ohio	85	15
New Hampshire	84	16	South Carolina	26	74	Michigan	73	27
Vermont	85	15	Georgia	33	67	Indiana	84	16
Massachusetts	75	25	Florida	45	55	Illinois	95	5
Rhode Island	78	22	Alabama	53	47	Wisconsin	90	10
Connecticut	81	19	Mississippi	60	40	Minnesota	98	2
New York	68	32	Louisiana	.....	.....	Iowa	100	.....
New Jersey	69	31	Texas	70	30	Missouri	95	5
Pennsylvania	76	24	Arkansas	65	35	Kansas	100	.....
Delaware	72	28	Tennessee	80	20	Nebraska	100	.....
Maryland	40	60	West Virginia	77	23	California	98	2
Virginia	59	41	Kentucky	97	3			

The manure of farm-animals is seen to be the main reliance for sustaining fertility. Commercial fertilizers—organic and mineral—are somewhat in use in New England, especially in Maine and Massachusetts, including quantities of fish-refuse and sea-weed. They are also used sparingly in the Middle States; but the cheaper minerals, lime and plaster, and still cheaper green-manuring, monopolize a large proportion of the percentages credited to "other fertilizers." The South Atlantic States from Maryland to Georgia, inclusive, use not only the largest proportion of manipulated fertilizers, but the largest quantity in comparison with other sections. The cost of such material amounts to millions in each of these States. Little fertilizing matter is applied to the soil from Alabama westward, with the single exception of such quantities of cotton-seed as are not required for seeding and for a few oil-mills. In the eastern portion of the Ohio Valley experiments are tried with commercial fertilizers by a few progressive farmers, and the use of clover as a fertilizer is considerably practiced there by immigrants from Maryland and Pennsylvania. And here we may stop. The remainder of the country has heretofore practiced the draining of farm-yard manures into creeks and rivers, or the removal of barns from their inconvenient accumulations; or, if they all have not literally adopted this practice, they have not indicated much faith in the necessity of manuring. And yet these returns show that the lands of Iowa and Minnesota, and even of Illinois, are made to bear an increase of 20 to 30 per cent. by a single experiment in green-manuring. Thoughtful western farmers are seriously pondering the economy and profit of prairie-land fertilization.

As to commercial fertilizers our correspondents generally appreciate their value for specific uses, acknowledge their utilty in supplying lacking material for plant-growth; accord to them a positive value in hastening growth and maturity, but persist in the opinion that there is fraud in the manipulation of some kinds, and that the genuine are held at too high a price. They know that for the regular uses of farm-fertilization they can obtain the needed elements at a cheaper rate.

Many examples are given of the renovation of worn and apparently worthless soils, and the increase of fertility in fresh but unpromising lands. Fields that have been cultivated exhaustively for twenty and even forty years have been restored to original productiveness, not by guanos and superphosphates, at $60 to $80 per ton, but by inexpensive local resources, the cheapest and most reliable of which is found in clovering. In one case in Butler County, Pennsylvania, a section of thin, gravelly land, on which it was thought no one could secure a decent living, came into the possession of German immigrants at nominal rates. They cleared off the brush, plowed, cultivated, turned under green crops; saved every fertilizing material available; never duplicated a crop in five or six years' rotation, and that tract is now a garden, and from worthlesness has advanced to the value of $100 per acre, and is yearly becoming more productive. These owners, in some cases, have raised and educated families, lived comfortably, ride in carriages, and have money at interest. In other instances in which the aid of clover has been invoked, swine-feeding in the clover fields has been made a valuable means of soil-improvement. In the South, a region which many northern writers on agriculture assume most erroneously to be unsuited to grass culture, and which southern farmers have strangely neglected as a meat-producing section for obvious reasons, a new era is dawning, and clover and orchard-grass are in many places found to be sources of immediate and heavy profit, and of greatly increased fertility.

In light lands of more torrid temperature the cow-pea performs quickly and inexpensively the work of amelioration assigned to red clover in argillaceous soils. It is a plant literally worth millions to the South; possibly as good an ammonia-gatherer as clover; perhaps equally as good for fattening swine, and grown with greater facility in poorer soils. This investigation presents prominently three suggestive points: First, the use of fertilizers is becoming more general and more discriminating; second, few, if any, soils in the country are so rich that they cannot be made more productive by judicious fertilization; third, farm-yard manures are the best for general use; green-manuring is the cheapest means of soil renovation, and commercial fertilizers are useful for quick results and for specific purposes.

FARM-YARD MANURE.—Except near large centers of population, where the fertility of the soil carried to market in cereal and vegetable products can easily be returned in purchased manures, the main reliance for soil-restoration in every system of prosperous agriculture, is the manure made on the farm. The certainty of its adaptation to the wants of the soil from which it has been extracted, the practicability of securing it, and that without paying out cash or incurring debt, and the gain in utilizing much that would otherwise be worthless, must ever give it precedence for general farming purposes, over all other fertilizers. Among the many advantages resulting to the farmer from having manufacturing or mining industries in his own neighborhood, prominent is that of being able to market for ready cash, hay, straw, and other coarse products, and at the same time cheaply replace the fertility taken from the soil in their production. The accumulations of manures in manufacturing and commercial cities and in the mining districts of Pennsylvania are taken at high prices, often $8 to $10 per cord, not only by gardeners and tobacco-growers, but by farmers, and their judicious use is found to be remunerative to such a degree that he who buys the most is usually found the most prosperous.

COMMERCIAL FERTILIZERS.—A majority of our returns indicate a growing preference on the score of comparative results and relative cheapness of home-made manures, over the manipulated compounds known popularly as commercial fertilizers. In many sections the use of this class of fertilizers is becoming more and more limited to garden productions, in the cultivation of which, hastening growth and maturity is an important element, and to special crops upon which the profitable effects of commercial compounds of established reputation have been proved by trial for a series of years. Repeated experiments with commercial compounds, which have ultimately proved unprofitable, have created a prevalent antipathy to *new* experiments. On the other hand, returns generally indicate that the use of unmixed organic or mineral fertilizers is on the increase. Adulteration in these is more easily detected, and the effects on like soils are comparatively uniform and well established. In the Eastern, Middle, and older of the Northwestern States neither commercial fertilizers nor home-made composts are used, to the neglect of farm-yard manure, but only as additions, after that has been exhausted.

A majority of returns from New England, including all from New Hampshire, report that commercial fertilizers are deemed unprofitable. But in Oxford, Me., superphosphates are considered almost indispensable, especially on corn, and in Penobscot and Cumberland they are used to some extent with favorable results, particularly gypsum on grass in the spring; gypsum is also popular in Franklin, Vt., and phosphates in Caledonia, on buckwheat and turnips, but not for general farming. The

same is reported from Norfolk, Mass., except that those which "tend to drive special garden-crops, may pay." In New London County, Connecticut, guano is liked for garden-crops, and superphosphates deemed beneficial on most crops; in New Haven, a great variety is used, which "pay well if of good quality and properly applied;" in Hartford they are used largely in connection with stable-manure.

About one-half the returns from New York report the profitable use of gypsum, particularly on clover. In Seneca it is deemed by far the cheapest commercial fertilizer; in Onondaga, in dry seasons, it nearly doubles the crop of clover. Lime is used in a similar way, though not so extensively, with like results. Exclusive of these, correspondents express the opinion, based upon experiments, that commercial fertilizers are not profitable. There are a few exceptions. In Broome they are considered profitable to drill in with wheat; profitable in some localities of Suffolk, and Chautauqua predicts that they will be more used in the coming than in any previous season.

In New Jersey, lime excepted, no county reports them unqualifiedly profitable. In Burlington, while marl, guano, and phosphates are largely used in some crops, the main dependence is on manure either made on the farm or purchased in Philadelphia. Guano only is used in Camden, and "less and less each season;" in Gloucester they are only profitable for special crops.

In Pennsylvania, lime holds the foremost place among commercial fertilizers. It is considered one of the cheapest, most reliable, and effectual. It is extensively used with uniformly favorable results. It is most used on clover or to facilitate decomposition in green-manuring. In Bucks, plowing under clover with the liberal use of lime is the cheapest and quickest way to renovate poor soil. Lehigh reports that to keep up a luxuriant growth of clover and other grasses a field should be limed every five or six years. Lebanon, that "the only practice of soil-improvement is with lime and barn-yard manure, repeated about once in seven years; 50 to 100 bushels of lime per acre is put on land for corn, and manure on oats-stubble for wheat. This process has doubled production on all crops within the last twenty years." Gypsum is used, less extensively, in the same way, and with a single exception like results are reported. Butler County reports that it is now much less used than formerly, being "deemed only stimulating in its effects by which one crop is benefited at the expense of the next." Returns are almost unanimous against the general use of compounded commercial fertilizers. High prices, frauds, and uncertainty of effect compared with farm-yard manure are the principal objections. One says "it increased the crop for one year, but had the effect to make the land more sterile after that." Another, "Guano has become so adulterated that its use has been discontinued by many." "Farmers have generally come to the conclusion that barnyard manure pays best." These are illustrations of the general tone. The only marked exception is from Adams, which reports that the better kinds are used by many of the best farmers, and that "the rapidly-increasing demand by intelligent farmers is evidence of their utility." In Bucks they are used advantageously to supply deficiencies in barn-yard manure, since the farmers, after having been extensively humbugged, are now more careful in selecting. Hence it is reported that the farmers in that and the adjoining counties control a large manufactory for phosphates and bone-dust, now in operation in Philadelphia, worked on the co-operative plan.

In Delaware they are less used than formerly.

In Maryland the current of opinion runs in the opposite direction. In

each of the returns the use of commercial fertilizers is reported, and the proportions indicated are 56 per cent. against 40 per cent. of farm-yard manure. Queen Anne reports that they are used freely, principally superphosphates, in the wheat-crop, and that even when wheat is low they pay well, as they will double the succeeding crop; Charles, that 90 per cent. of all fertilizers are commercial, and are specially profitable on the after-crop of clover for improvement of land; Calvert, 60 per cent., mostly Peruvian guano and superphospates, and profitable for the tobacco-crop; Montgomery, also 60 per cent., and Caroline 50, and profitable in both; Harford, that they are the principal fertilizers used, by far the largest part being bone-dust, and deemed profitable at about $42 per ton; Carroll, that bone-fertilizers are profitable, but none others; Washington, that bone-fertilizers are profitable on all soils. On the other hand, in Worcester, though 67 per cent. of all fertilizers are commercial, they are deemed unprofitable—"in many instances the result has been injurious to the land and disastrous to its cultivator;" in Talbot, though the chief reliance is on them, they are "not always profitable;" in Prince George, about 10 per cent. of the fertilizers are commercial. chiefly used on tobacco, but now so adulterated as not to be profitable; and in Cecil the price is found too high to to admit of much profit.

Fifty-four returns from Virginia indicate that 40 to 50 per cent. of the fertilizers used are commercial. They are largely used on special crops, as tobacco, wheat, and garden-truck. Gypsum and lime, or shell-marl, are extensively used with special reference to the production of clover and grass-crops. The general tone of returns indicates a profitable use for these special purposes, (and especially crops for market on which profit largely depends on early maturity,) but not for general farming. The following extracts, among others, show the direction in which the views of advanced farmers are tending in respect to the use of different fertilizers:

Sussex: Our best farmers now use all their available means in the making of farm-yard manures and composts, and are realizing commensurate advantages from such efforts. It has become a fixed belief among our farmers that the commercial fertilizers give no really profitable return, and only embarrass with debts which all the crops made by using them barely liquidate. *Henrico:* Peruvian guano and superphosphates largely used, but bone-dust yields better results than any fertilizer except farm-yard manure. *Powhatan:* Profitable on tobacco, followed by wheat, if combined with farm-yard manure. *Lunenburgh:* Commercial fertilizers are mostly used, but are less profitable than farm-yard manure. *Loudoun:* Extensively used, but, gypsum excepted, the impression is gaining ground that they do not pay.

With respect to their advantageous use in grass-culture the report from Montgomery states: "Farmers have been very successful in setting grass on exhausted lands by drilling in fertilizers with wheat. Lime gives good results, and a clover-crop is increased 50 to 100 per cent. sowing plaster." In Westmoreland, though for the last few years they have yielded little if any direct profit, "still, considering the improved condition of the land and its increased adaptation to the cultivation of grasses, the use of them is regarded as judicious;" in Shenandoah, they are deemed profitable in securing good stands of grass; in Wythe, profitable from the certainty with which grass, sown with wheat, sets; in Chesterfield, gypsum is least expensive and most effective, especially on clover and peas; in Prince Edward, desirable on clover and the grapes. The tide-water regions find fish a great resource in fertilizing. In several counties the use of commercial fertilizers has been abandoned on account of frauds; in a large number they are reported unprofitable without qualification.

The remaining Atlantic and eastern Gulf States report a growing disposition to supersede the use of commercial fertilizers by home-made composts; but the former are still somewhat extensively used on wheat and cotton, and, in North Carolina, on tobacco. Several counties in this State report that the use is confined to tobacco; in a majority of the counties reported, they are either not deemed profitable, or only so to a limited extent under specified conditions. In Caswell, there is a general disposition to dispense with them; in Lenoir, less used than a few years ago; in Martin, not one-fourth as much used in 1874 as in 1873; in Chatham, less profitable than manure and home-made composts; in Wake, "easily handled and well adapted to a thriftless farming community, they are used by every planter who has the money or the credit to buy; but the more intelligent and successful planters are learning to depend on home-sources for ammonia, and only purchasing the phosphates." A few returns are unqualifiedly favorable. Randolph reports that on thin, worn-out land, 200 pounds of guano per acre frequently increases the yield of wheat four-fold; Cleveland, that they pay fully 50 per cent.; Duplin, that they are almost a necessity for the production of cotton, paying 50 to 100 per cent. on the investment; and Gaston, that the use of them is on the increase. Several returns specify the use of gypsum on clover with profit. In Clay, lime is found very beneficial; only one-third of the returns specify the proportion used, but, so far as indicated, it amounts to about 13 per cent. against 36 of home-made compost and 51 of farm-yard manure.

Returns from South Carolina make the amount of commercial fertilizers used equal to that of both farm-yard manure and home-made composts. A majority report that they are deemed profitable; Barnwell, that they yield 30 to 50 per cent. on cost; Williamsburgh, that, under favorable circumstances, they pay more than 100 per cent. But there are some important qualifications: in Richmond, they are thought profitable *if the farmer can pay cash down;* in Beaufort, home-made composts prove more profitable; in Fairfield, while the ammoniated superphosphates are deemed paying fertilizers, the same value in composts, with acid phosphates, is more remunerative; in Greenville, the yield of cotton, per acre, annually decreases, and the expense of fertilizers increases.

In Florida, returns indicate that the use is very limited and apparently decreasing. Owing to a want of knowledge in their proper use, and to impositions, they have grown into disfavor in Madison County; in Gadsden, with few exceptions, the use of them is abandoned; in Suwannee, they are deemed unprofitable. Per contra: Orange reports that they are profitable, and used more and more every year, Peruvian guano being the favorite; and in Putnam and Santa Rosa they are profitably used on garden-crops. Phosphates, bone-dust, salt, ashes, gypsum, guano, and fish-guano are specified.

Though returns from Georgia show that two-fifths of the fertilizers used are commercial, only about one-fourth report them positively profitable; another fourth, either of doubtful utility or less profitable than other fertilizers; and the remainder positively unprofitable. There appears to be a decided movement toward substituting for them home-made composts, and a growing appreciation of farm-yard manure.

Brooks: It is a question whether they have not done more harm than good; thousands of dollars are paid out annually, and when the season is not suited it is demonstrable that it would have been better if they had not been applied. *Stewart:* Largely used from 1869 to 1872, inclusive, but less now; certainly have helped to impoverish our people. *Upson:* Most are purchased on time, and when pay-day comes round, planters swear that the stuff did no good and is the last they will ever buy. But when planting-

time comes again they say, "Believe I will try it once more." *Harris:* Not valuable or profitable, except a few chemicals needed to make compost with manure and cotton-seed. *Baldwin:* Farm-yard manure more profitable. *Murray:* Farm-yard manure preferable by far. *Columbia:* Farmers have at length found out that they were "paying too dear for the whistle." *Decatur:* Not so many use them as formerly. *Cherokee:* Home-made composts have proved much more profitable. *Troup:* Farmers beginning to see the folly of using so much of fertilizers to the neglect of home-made manures. Will use next spring not more than one-third the previous quantity. *Henry:* Will be less used, as farmers are making two-thirds compost, or phosphate and farm-yard manure. *Gwinnett:* Farm-yard manure entered but little into fertilizers until last year; then it was composted with "chemicals." The composts at a cost of one-third of commercial guano were equally valuable. *Jefferson:* Farm-yard manure composted with cotton-seed more valuable.

The most prominent returns of favorable results are from De Kalb, where 1,500 tons are used, mostly for cotton, at an average cost of $60 per ton, which pay a very good profit; in Houston, where 2,000 tons are used; in McDuffie, giving 20 to 30 per cent. of profit; and in Carroll, very profitable when the land is well worked. West of Georgia commercial fertilizers are little used.

A large majority of returns from Alabama declare them unprofitable. Cotton-seed is largely composted with manure and other ingredients, and farm-yard manure constitutes about 53 per cent. of the whole. In Shelby, commercial fertilizers, when not used in connection with vegetable matter, are considered a positive injury; in Conecuh, used in 1867–'70, but very little since, proving less profitable each year; in Bullock, less used last year than for several years previous; in Pike, while some deem them profitable, many of the best farmers think otherwise; in Lowndes they have been mostly abandoned; but in Russell they are considered very profitable if pure; also in De Kalb, (with the same qualification,) "especially on cotton, increasing the yield 100 to 200 per cent.;" in Lauderdale, among them, only gypsum on clover and other grasses has proved profitable.

From Mississippi few returns with definite specifications have been received. The use of commercial fertilizers appears to be quite limited and not increasing, farm-yard manure and cotton-seed being the main reliance. In Rankin they have been found unprofitable and abandoned; in Clark, profitable, when the land is subsoiled and the fertilizer covered deep, but manure and cotton-seed are deemed better. Claiborne reports that they increase the yield one-third; and Pike, that they are profitable in the hands of skillful planters.

The returns from Louisiana which answer the inquiry report that they are not deemed profitable. In Claiborne they have been tried and abandoned. La Fourche, where bone-dust has been used, is the only parish reporting the present use of any commercial fertilizer. Cotton-seed takes the precedence, then manure and composts.

Among over fifty returns from Texas no one reports the use of any commercial fertilizer. The same is true of Arkansas, except that Drew reports that guano, superphosphates, &c., were tried on cotton six or seven years, and did not pay. In Tennessee, nearly half the returns specify the use of gypsum, largely in connection with clover, and, as in other States, the results are uniformly favorable. Lime is used less extensively, principally as an ingredient in composts. With these exceptions, the use of commercial fertilizers is very limited, and apparently declining. In Greene and Putnam they are less used than formerly; in Washington, only used by farmers who drill in wheat, and in that case are very profitable, as they hasten the maturity of the grain.

In West Virginia the use of commercial fertilizers is very limited. Not including lime and gypsum, which are used to some extent, two-

thirds of the returns report the use not profitable; others, a doubtful result; and only two a decidedly favorable one. Marion reports that 150 to 200 pounds of Peruvian guano on poor and exhausted land will increase a wheat crop about 16 bushels per acre; and Mineral, that they are much more used than formerly. The reason assigned is that, as farmers generally do not house their stock, and therefore have no farm-yard manure, by using commercial fertilizers they largely increase their productions.

In Kentucky and Ohio, lime, gypsum, and bone-dust are used to a considerable extent with beneficial results. A few other kinds have been tried on a small scale, but in Kentucky the returns are unanimous, and in Ohio, with but few exceptions, against the use of them. In Christian, Ky., gypsum is very profitably used on both clover and tobacco; in Ashland, Ohio, on clover and corn; in Adams, bone-dust and superphosphate of lime were tried last season with marked good results. In a field made up of clay land, flat and rolling, and marly banks, the owner drilled in with wheat a commercial fertilizer, omitting the latter in some rows. The result was, in place of 2 or 3 bushels per acre on the wet and 10 on the dry, clay land, and 15 on the marly banks without the fertilizer, an average of 20 bushels per acre on the whole with it, and a good set of grass in place of none. In Washington the practice of using bone-dust for wheat on old fields is increasing.

In Michigan commercial fertilizers appear to be little used, and for the most part deemed unprofitable, except gypsum, the profitable use of which on clover and other crops is noted in almost every return. Cass reports its extensive use, and the prevalent belief that, at the price paid, and at the rate of 50 to 100 pounds per acre sown on clover to pasture or for green-manuring, fertility can be given to soil as cheaply as with barn-yard manure, at no expense except that of hauling it half a mile. The following extract is from the return of Clinton:

> The theoretical rotation for crops is, first year, corn in sod; second, oats, with wheat in the fall; third, clover and timothy sown with gypsum and the wheat taken off; fourth, gypsum sown, and pastured; fifth, gypsum sown, and mowed. This system does not produce wheat enough to suit many, and they supplement it by plowing under clover for wheat, seeding the following spring, pasturing, but not closely, the next summer till July, then plowing up and sowing wheat again. In this case gypsum is sown every spring. This system has been followed on some fields for fifteen years, with constantly increasing yield.

In Indiana, also, gypsum is extensively and profitably used. Noble reports that it constitutes 60 per cent. of all fertilizers, and applied to clover-fields increases the crop about one-third; Elkhart, that it is applied much more extensively than farm-yard manure, the only other fertilizer used; Kosciusko, that on an old field covered with sorrel it was freely sown while the sorrel was green and immediately plowed under as fallow. In the fall it was seeded to wheat, which yielded 40 bushels per acre. Before the use of gypsum the same field had yielded only 10 to 15 bushels. A few returns note the use of lime and more of bone-dust, with good effects. Other commercial fertilizers are but little used, and, with few exceptions, reported unprofitable. In Floyd, bone-dust and superphosphates are profitably used, the former for permanent and the latter for immediate effects. Also, offal from the slaughter-houses is very profitable; screened coal-ashes in orchards, salt and lime in preparing ground for every purpose except for corn; and wood-ashes when properly applied.

In Illinois, out of sixty-four county returns, four specify the use of gypsum and three of lime, in small quantities; four composts, and one, Pulaski, "ashes and sawdust to a limited extent." All others return

farm-yard manure only, quite a number stating that that is little used. Fayette and Kankakee report that gypsum has been tried and not found profitable. Passing into Wisconsin, gypsum again becomes popular. More than half the returns report the use of it, and none specify unfavorable results. Lime is used to a considerable extent, but no other commercial fertilizer is reported.

In Minnesota, out of thirty-six returns, the exclusive use of farm-yard manure is reported in all, except salt in Crow-Wing, with good effect; gypsum, lime, and compost, in Olmstead; lime in Isanti, and ashes and lime in Steele. Out of fifty-three returns from Iowa, but a single county reports the use of any other fertilizer than farm-yard manure. In Delaware County, a small quantity of gypsum was used last year, for the first time, with profitable results. The case is not much different in Missouri. Grundy reports the use of some bone-dust with profit; Nodaway, that lime, gypsum, and ashes are highly valued by the best farmers; Callaway, that some guano is used on fine tobacco, as it is thought to yellow it and make it ripen sooner; Washington, that some lime has been tried and found profitable; and Cape Girardeau, that gypsum is applied to clover. These are the only returns out of over sixty which report any use of commercial fertilizers. In Kansas, Nebraska, California, and the Territories, their use is as yet unknown.

Home-made composts.—Returns generally concur in reporting an increasing use of composts mixed on the farm. They especially indicate, in the cotton States, a growing conviction, confirmed by the results of experiments, that it is far more safe and economical to buy commercial ingredients known to be suitable to combine with manure and other composting elements on the farm, than to pay the extravagant price demanded for commercial compounds, which often prove to be adulterated and comparatively worthless. In New England, barn-cellars are the rule with the best farmers, (but unfortunately this is not the larger class,) and muck, loam, or other material is hauled in to absorb the liquid manure, while the stock is at the barn. The same is true of the hog-pen. In the Eastern States, whenever wood-ashes are made they are utilized, leached or unleached, in supplementing farm-manure, sometimes in composts, but perhaps oftener in the hill or drill. Lime, with scrapings from the road-side, and whatever refuse is available, enter into composts. In the Northern Atlantic States, on the coast, manure on the farm is extensively supplemented by marine fertilizers, as muscle-mud, sea-weed, fish refuse, &c., all of which are very profitable. In the neighborhood of cities, fertilizing matter of all kinds, which accumulates in them, enters largely into composts. The return from Camden, N.J., for instance, reports that thousands of loads of street-sweepings from Philadelphia, mixed with stable-manure in the proportion of 2 to 1, are used as a highly valued fertilizer. In the Southern States mineral or other commercial ingredients enter more largely into composts with cotton-seed and farm manure. Edgecomb, N. C., reports a system of composting, which, though it involves a combination of elements not in accordance with received opinions, has produced the best results for more than twenty years. The ingredients are soil or subsoil, (often more valuable in composting than worn soil,) not too sandy, cotton-seed, or any material which will ferment, any animal manure, and shell-marl, lime, or ashes. The proportions are about 1 bushel of cotton-seed (or its equivalent in other vegetable manure) to 25 of earth, 5 of animal-manure, and from 40 to 60 of marl or lime; all to be thoroughly mixed. Our reporter has lands which he has cultivated in

this way for more than twenty years, and they are more productive now than at the beginning. The general conclusion in the county is, that the best results are secured from farm-manures by composting them. Fairfield, S. C., reports that dissolved bone, ground and made soluble with sulphuric acid, added to cotton-seed, makes a very cheap and popular fertilizer, which is coming into general use. The following extracts from returns in Georgia, while they indicate the change for the better in progress, afford hints which may be valuable to other sections :

Harris : Very many planters are making their own fertilizers with farm-yard manure, top-soil, cotton-seed, and phosphates. *McDuffie :* Compost made by mixing one ton of ground bone and different acids with one and a half tons of cotton-seed and one and a half tons of stable-manure, is far superior for corn or cotton to any of the commercial fertilizers, and does not cost over one-third as much per ton. *Bartow :* A compound of acid phosphate and cotton-seed has been used for the last two or three years, and the use is annually increasing. It costs about $20 per ton of 2,000 pounds, and is equal to the regular manipulated commercial manures sold at $55 to $60 per ton. *Wilkes :* Composting, by one of several formulas, as gypsum, acid, phosphates, &c., is increasing every year. *Camden :* The cheapest plan for making manures here is by yarding cattle at night in a pen well filled with alternate layers of marsh grass and marl muck—these materials being plenty. With proper system one cart-load per week of "long manure" to each animal can be made and well adapted to our sandy soil. *Troup :* Farmers are seeing the folly of using so much of commercial fertilizers to the neglect of home-made manure. *Jefferson :* Farmers are waking up to the importance of the compost-heap, and it is devoutly hoped that the time is not distant when it will supersede and crowd out the costly commercials which deplete the pockets of farmers in Georgia of millions every year.

Returns from Florida and Alabama show that these States are beginning, and only beginning, to follow the example of Georgia in home-made composts. In Mississippi and Louisiana cotton-seed is almost the only fertilizer used; even farm-yard manure is neglected; and in Texas and Arkansas both of these are extensively coupled together in the returns as the only fertilizers. In the States west of the Mississippi there is no composting worthy of mention. In Tennessee and West Virginia, and the States further north in the Mississippi and Ohio Valleys, the practice has as yet made but little progress.

GREEN-MANURING.—Returns show that the practice of plowing under clover as a green manure is gaining in all sections where clover is grown to any extent. That it proves one of the cheapest and most effectual means of improving soils, and at the same time one of the most valuable fertilizers for growing crops, and especially for wheat and corn, is made evident by very general returns, in which testimony, as will be seen below, is largely fortified by definite facts, as ascertained by experiments continued for a series of years. A very few report that this process of manuring is not practiced for the reason that some other is considered more profitable; but only two report that it is positively injurious. Juniata, Pa., reports that it is "considered worse than useless," and Duplin, N. C., as follows:

Our farmers are averse to green-manuring with any crops, believing it a positive injury rather than a benefit to the land. A few years since the Bear Marsh Agricultural Club instituted a series of experiments with the cow-pea as a manurial crop, and in every instance, where the peas were plowed under green, the land failed to produce as good a crop as when the peas were allowed to mature and fed off on the land. In 1868, a gentleman from Pennsylvania purchased a farm in this vicinity, and in September turned under the growth of weeds &c. green, on part of a field of low ground, and to this day the portion so treated has never produced so good a crop as the remainder of the field.

Returns indicate that the first crop is turned under less frequently than the second, and that less frequently than stubble. But throughout the more northern States, in which hay is the most valuable production,

and fields are usually continued in grass so long as they yield a paying crop, the all but universal custom in seeding down land is to sow clover and timothy together. The first crop will be clover almost exclusively; after that the timothy gradually gains on it, and usually by the third or fourth year wholly supersedes it; and, therefore, when the field is plowed it is timothy rather than clover stubble which turns under. Owing to the value of clover for hay in New England and some of the Northwestern States, buckwheat is not unfrequently used as a substitute in green-manuring. In the South Atlantic and Gulf States, where hitherto but little clover has been grown, the "cow-pea" is used quite extensively, and the reported results are, almost without exception, very satisfactory.

Penobscot, Me., Sullivan, N. H., Berkshire, Mass., Washington, R. I., and Hartford and New Haven, Ct., report the full crop turned under, to a limited extent, with good results. In the latter county it "serves as a good basis for a tobacco-crop," but in Windham it is thought more valuable for hay. In New York the practice is more general. In Suffolk some farmers turn under the full crop with benefit; but it is generally thought that the crop of clover-hay fed to animals, with the consequent profit on them and the dropping returned to the soil, is more profitable. In Albany, though better crops can be obtained after clover than after timothy, yet, as the latter brings one-third more than clover, farmers "will crop with it, since they must have the crop that brings the most money, in order to meet current expenses." In Queens, some permit clover to grow till the early part of May and then plow under for corn, with improvement to the land; but sedge-hay from the salt-marshes is frequently plowed under with superior results. Our correspondent says: "I have raised 100 bushels of shelled corn to the acre, and our agricultural societies have given premiums to crops of 120 bushels per acre from land manured by sedge-hay raked into the furrows." In Columbia, stubble turned under "improves the soil to a large extent." In Niagara, both the full crop and the stubble turned under for wheat give satisfactory results. In Washington, though only practiced to a limited extent, it is deemed the cheapest fertilizer known, "used in any manner convenient for the time." In Genesee generally the whole crop is plowed under the latter part of June, and considered the best way of improving soil and keeping it fertile. In Ontario, plowing under the full crop has been discontinued, and the practice is now confined to stubble. Among other counties reporting the practice are the following:

Yates: The whole of the first crop turned under in full bloom, and the land left fallow until seeding-time for wheat; the second crop, and most frequently only the stubble, turned under just in time for wheat. The first mode the best. *Seneca:* Extensively; the full crop not turned under as much as formerly. The first year the first crop is cut for hay, and the second for hay or seed, according as it fills; the second year the first is cut, and the second for seed, if it fills well, and the stubble turned under for wheat. If the second crop does not fill, the whole is plowed under. *Greene:* Usually plow under the first crop in June; replow the 1st of August, and about the 1st of September sow wheat or rye. A good crop of clover turned under is better than twenty loads of barn-yard manure. *Onondaga:* Not extensively; my neighbor sowed 10 acres to clover; the second year plowed it under in August, and sowed to wheat the 1st of September. Though the land was poor the yield of wheat was 25 to 28 bushels per acre. But present pay, or all we can get this year, seems to govern; so most of the farmers cut the second crop of the small variety for seed; if the large variety, they feed till the 20th of June, then turn off, and save for seed. Realize 2 to 4 bushels of seed per acre. *Schenectady:* The common method is to sow 1 peck of clover-seed and 1½ bushels of plaster per acre; next season pasture or cut the crop; the latter is considered best. Two or three crops are thus taken off, then the stubble turned under; the next crop corn, then oats or barley, with clover as before. Where this rotation is practiced I have never known it fail to improve any soil where clover will grow.

In New Jersey, green-manuring with clover is practiced to a limited extent. In Gloucester the clover is mowed and pastured, and the stubble plowed under the second year; in Warren, the stubble only for corn; in Burlington, plowing under the crop is little practiced, because pasturing with hogs, cattle, and sheep, and plowing under the sod is preferred; in Hudson larger crops of corn and potatoes result from turning under red clover.

In Pennsylvania, green-manuring with clover, in connection with lime or gypsum, enters somewhat extensively into a system of rotation in which the culture of wheat, corn, and hay predominates. In Bedford the practice is growing in favor, and "universally deemed profitable;" in Lancaster, considered by the best farmers a progressive step in agriculture; in Tioga, the second crop for wheat, next to farm-yard manure, the best and cheapest fertilizer, and "should be at least two years old before turning under, as the roots are more valuable than the stalks;" in Fulton, it is less practiced than formerly, because farmers keep so much stock, and lime their land freely; in Montgomery, top-dressing with manure, lime, and compost is considered far better; in Dauphin, also, returning in manure all the hay grown on the farm, and turning under the stubble is thought to result in a greater improvement of the soil than turning under any green crop; in Montour, turning under clover in either mode is deemed equal to a coat of manure.

The extracts which follow will illustrate the varied practice and afford convincing evidence of satisfactory results.

Cumberland: The second growth plowed under in July for winter-wheat brings a fine crop. A good bed of grass plowed under in the fall for corn produces as large a crop as if the land was coated with barn-yard manure. *Clinton:* All who have tried it concur in saying that it benefits the land as much as, if not more than, a full dressing of barn-yard manure. *Bucks:* The custom is to sow clover on oats, let it lie one year, pasture or mow the following season, and plow for wheat after harvest. I have practiced it for fifteen years with marked advantage to the soil. *Adams:* To a limited extent by the better class of farmers who can spare in this way a good crop of grass. The second or third crop is usually turned under. *Washington:* In connection with lime produces excellent crops. This method followed by those who practice rotation, and it is claimed that by it land may be constantly improved. *Westmoreland:* Where grazing is more of an object than the cultivation of the cereals, clover-fields are pastured in the fore part of the season, and the ripened after-growth cut for seed or plowed under for a crop of wheat. In the latter way a very good stand of clover is obtained the next season, while the wheat and soil are both benefited. For many years I have pursued this course with decided success. *Fayette:* To some extent; second crop in high favor with our best farmers. Its beneficial effects not only in affording plant-food, but in securing a better mechanical condition of the soil. *Wyoming:* I came in possession of a field of five acres which had been cropped till nothing but mallows and pennyroyal grew, and it had been left an open common. I planted it in corn, using plaster for a fertilizer. The next spring sowed oats and one peck of clover-seed. The third spring sowed plaster on the clover. The last of August plowed under all that grew; sowed to wheat, and the following spring clover-seed on that. In the summer pastured the clover a very little, but in August plowed under the clover, sowed to wheat with clover-seed in the spring. The fifth summer mowed the first crop of clover, and plowed under again in August for another crop of wheat with clover-seed. In each instance plaster was sown on the crop after sowing the clover-seed in spring. The result of this fertilizing with clover and plaster, and cropping with corn, oats, and wheat, was, the land was made rich enough to produce any crop. The last of the three successive crops of wheat was attacked by weevils, which commenced on the outside and left scarcely any wheat within 16 or 20 feet of the fence; but the five acres yielded 102 bushels—20⅔ bushels per acre. *Lancaster:* I know of a tract of land that has been cultivated for twenty-six years and good crops raised by the application of clover turned under alone. The hay, corn-fodder, and straw have always been sold, and yet the land improved. *Clearfield:* The general practice, mow the first crop, let the second crop grow until after harvest, and then plow under whatever may be on the ground; harrow well, give a top-dressing, then put the wheat in with a drill. The wheat does well and the soil improves under this mode of treatment. My brother raised 34 bushels of Fultz wheat to the acre last year. *Luzerne:* The chief reliance of our farmers is barn-yard manure and clover, about half

and half. When clover is plowed under, it is usually after the first bloom has been fed off and a second has grown up and somewhat ripened. This usually gives the best result, as by this process the roots become larger, there is more growth of top, and often seed enough to renew the crop. *Erie:* The most successful rotation is, mow clover twice, and the next spring put on a heavy coat of stable-manure, plow under, and plant to corn; the next season, to oats or barley, and wheat the same fall, with clover the next spring.

From Delaware, Newcastle reports the practice by the best farmers, and with most gratifying results, especially on clay lands.

In Maryland the practice is extensive; that and commercial fertilizers constituting about three-fifths of all used. The following extracts, from very full returns, afford specimens of prevailing processes and results:

Cecil: After mowing and pasturing the sod is plowed under for corn, by which farms are very much improved; mine yields double, perhaps threefold, what it did twenty years ago. *Dorchester:* Generally the first crop is cut for hay, then pasture till time for stock to come to the barn; then plow under for corn; the best fertilizer we can get for that, and tells on the wheat-crop which comes after. *Charles:* Generally practiced; the first crop allowed to fall to the ground, as a cover, intead of turning it under, because regarded as preferable for its fertilizing effects. Have reclaimed an old worn-out field by using Turner's Excelsior, at the rate of 200 pounds per acre; a good stand of wheat and clover, the latter allowed to fall on the land, not grazed. The following year the increase of corn was threefold, the season not being very favorable. Clover is wholly regarded as the cheapest and most permanent fertilizer. *Carroll:* The full crop turned under for wheat considered by some as equal to a good coat of barn-yard manure. *Queen Anne:* On nine-tenths of our arable land red clover is almost invariably sown to succeed the wheat and oats crops. This clover is generally pastured the second summer, and, if not left over, is fallowed in August for wheat. We consider a good clover lay the best fertilizer for a wheat-crop. If the ground is well prepared, and a moderate amount of superphosphate drilled in with the wheat, to give an early start, a good crop, say 20 to 25 bushels per acre, is the almost certain result. Red clover is to us what the turnip-crop is to England. *Calvert:* The full crop seldom turned under; the usual practice to turn stock on the second year, when the clover is in full bloom; the stock trample most of it under foot, and it is plowed under the following spring. This system considered quite improving to the soil. Some years ago I had an odd corner, of five acres, thoroughly exhausted and dead-poor. I plowed the land, harrowed in commercial fertilizers at the rate of 400 pounds per acre, and planted in corn. The season was favorable, and the crop 40 bushels per acre, which paid for fertilizers and left a handsome profit. I followed the corn with wheat, drilling in an additional 200 pounds of phosphate per acre. The wheat-crop did not pay expenses, but the succeeding crop of clover was unusually heavy. This was flushed under the second summer, and wheat drilled in, with 200 pounds of phosphate. The result was a crop of 22 bushels per acre; worth more than the land would have sold for a few years before. I have since kept up the use of clover and phosphates upon that piece, without applying farm-yard manure or lime, and it is now as productive as any land I have.

From Virginia, forty-four out of fifty-four county returns note the practice, either with clover or pease, but in a large majority of instances the extent is very limited. These returns bear concurrent testimony to profitable results to both soil and succeeding crop. In Henrico, the green crop is not turned under, because the hay brings so high a price in the city, and farmers think they cannot afford to wait for the results of plowing under.

Middlesex: Practiced by all farmers whose land will bring clover. The full crop turned in soon as the heads begin to be brown, so as to insure a second seeding for the spring following. Wheat is sown, and when a good crop of clover has been turned in a heavy growth of wheat is considered sure. The soil in a high state of improvement, compared with other lands; good crops and thrifty farmers are the results of this practice. *Dinwiddie:* Generally the second crop plowed under in July or August. If a good crop of clover is turned under, a good crop of wheat follows, and the soil is permanently improved. *Matthews:* Field-pease more highly prized. These we sow in our corn and fallow either green or dry, and generally with good success. Peculiarly suited to our soil and climate, and of rapid growth, it is more valuable to use as a fertilizer than any crop we can raise. *James City:* The pea-fallow considered the best. *Craig:* To a large extent and with good results; sow plaster on first crop; cut for hay

or pasture off; plow under second crop and sow wheat, which never fails to yield a good crop. This is the cheapest way to improve our lands. *Chesterfield:* Extensively practiced; the second crop, when the seed has matured, is turned under. The better plan is to seed the land with oats in March, and then apply the clover-seed. If the land is rich enough, this invariably secures a good start. The following spring a good crop of clover is secured, and the second crop turned under. This continued a few years, with ten to twenty bushels of lime per acre, will result in increasing the wheat-crop at least 50 per cent. *Clarke:* The second crop; the land highly improved by clover and gypsum without any other fertilizer. *Prince Edward:* The second crop turned under for wheat generally results in a fair crop of wheat and always in improvement of the soil. *Mecklenburgh:* The second crop turned under, and considered the very best fertilizer for wheat.

In the remaining Atlantic and the Gulf States the practice is very limited, one reason being that clover is little grown. Twenty-one of the returns from North Carolina note the practice to a limited extent, five of them being with the cow-pea. In Burke, peas sowed in time to reach full growth by the last of August, and turned under with deep plowing, for wheat, are thought equal to clover, and much cheaper. "Peas seldom fail to yield a good growth of vine, even on poor land." Beaufort reports that pea-vines turned under after the peas have matured increase the succeeding cotton-crop 15 to 20 per cent.; in Pasquotank, clover turned under, though rarely done, is followed by wonderful results; our correspondent, in 1870, "had sixty acres in clover, turned the crop under in October, planted in corn the next season, and the usual crop was nearly doubled;" also, about ten bushels per acre of peas sown immediately after a crop of wheat or oats was taken off, and turned under when they commence maturing, nearly doubled the following crop, and were cheaper than the use of clover. In Wake, owing to very beneficial results, the practice of green-manuring with peas is increasing.

So far as reported from South Carolina and Florida the practice is confined to the cow-pea; in the other Gulf States, and Arkansas, the very limited practice is divided between the pea and clover. In Burton, Ga., clover turned under for wheat increases the yield, "at the lowest, one-third, and the land is improved 15 per cent. for subsequent crops. In Hall, farmers have been cultivating clover for ten years with very profitable results." They generally get two crops per annum, and the third year turn under the stubble, which improves the land greatly. In Taylor, crab-grass turned under in September "adds 20 per cent. to the next crop of corn or cotton." In Lauderdale, Ala., the second crop is sometimes turned under "with fine effect, almost doubling the yield in corn or wheat."

The practice becomes more prevalent again in Tennessee and West Virginia, being noted in more than half the returns. Clover predominates, but the pea is employed to some extent in the former, and in the latter State buckwheat and oats are used. Raleigh reports that some estimate that green oats turned under pay better than clover. In Tennessee, clover turned under has made lands "more productive now than they were thirty years ago" in Hancock; is considered the best fertilizer in Loudon; makes the best and surest crop of wheat in Sullivan; adds very much to the production of cotton, corn, and tobacco in Dyer; is the cheapest way to manure in Smith; increases the crop one-fourth in Williamson; improves the land every year in Putnam, and "in connection with lime proves one of the best fertilizers ever used."

A large majority of returns from Kentucky report the practice, in some form, to a greater or less extent, with uniformly favorable results. "Always benefits the succeeding crop;" "increases the crop of corn or wheat one-third;" "considered the great fertilizer of the country by our best farmers;" "red clover our best restorer of lands exhausted by

corn and other cereals;" "has a fine effect on the land, and increases the crop of wheat one-third"—these are specimens of reported results. The following more extended extracts are selected from a mass of similar ones:

Hart: For wheat it is thought best to turn under the full crop when in bloom; for corn, to turn under the second when in bloom, subsoiling at the same time; preferable to other modes of soil-improvement because by far the cheapest. *Hardin:* The second crop turned under, or the first grazed about a month, then left to grow till plowed under, in September. This always produces a fine crop of wheat, and when corn follows the next season the benefit is plainly seen. *Russell:* Usually pastured very close and turned under in winter or spring, when the land receives no benefit except from the roots. Lands run two years in clover, pastured close, and turned in winter or early spring, will produce at least 25 per cent. more corn than other lands of the same quality not clovered. *Mason:* About 1827 or 1830, red clover was introduced, and from that time has been our chief and almost our only fertilizer, entering into the crop-rotation on every farm. And, to-day, I have no hesitation in saying that fields which tired and were thought exhausted forty years ago, will yield a heavier crop of grain, hemp, or tobacco than when just cleared—never having had one dollar, save for clover or other grass seed, expended on them, or a single load of manure applied save the droppings of stock when fed or pastured thereon. Clover when sown alone is relied on as pasture only for hogs, and plowed under generally the fall or winter after the second year, for any and every crop, always with marked improvement.

Out of fifty-four returns from Ohio, fifty-one counties report the practice, though in a large majority the extent is quite limited. As in Kentucky, these reports concur in ascribing to the practice large advantage to both crop and soil. A few extracts selected from many, as illustrations, follow:

Fulton: We estimate one fourth more wheat from the green-manuring. *Vinton:* The far better way to let the clover mature and the seed ripen before turning under. *Ashland:* Growing in favor every year. When the clover is nearly fit to cut, to plaster it before turning under, and then summer-fallow for wheat, is the most effectual and profitable method of manuring land. *Loraine:* Always improves the soil and often adds several bushels per acre to the crop of grain. The clover-roots the principal benefit to the soil. *Highland:* Judiciously practiced, it reclaims our worst worn-out lands. *Muskingum:* No other practice here proves so effectual for preserving the fertility of the soil. *Monroe:* By the practice the soil is improved at least 50 per cent. above the result of the common practice of cropping with barn-yard manure only. *Butler:* In connection with manure it is regarded as the great and cheap renovator of the soil. *Washington:* I have a field of 16 acres on the Muskingum River, of what we call bottom or plain land. It had become so reduced by continual cropping that it would produce only about 12 bushels of wheat or 30 bushels of corn per acre. In the winter of 1866 I sowed it to clover and secured a fine set. I let it remain without mowing or pasturing of any account, and it gave a fine growth in the summers of 1866 and 1867. In the fall of 1867 I turned it under, taking two boys to keep the furrows clear, and sowed it to Mediterranean wheat. In 1868 I harvested from the field 512 bushels of good sound wheat, (32 bushels per acre.) The next year it yielded 75 bushels of corn per acre. The seasons have not been so favorable since, but the land is now in better condition than in 1865.

Returns from Michigan, Indiana, and Illinois indicate that the practice has made considerable progress, though less extensive than in Ohio. In Michigan it is found a good fertilizer for fruit-growing. Ottawa reports that if the land is to be set in small fruits the next season, a full crop plowed under and summer-fallowed brings it into fine condition, and is much cheaper than commercial fertilizers. In Lenawee it is practiced by all farmers, and the full crop gives the most satisfactory results; in Van Buren, on the oldest and best cultivated farms, with the "invariable result of great improvement;" in Gratiot, is becoming more popular each year; in Calhoun, has increased the quantity and quality of wheat, so as to make the average yield at best 20 per cent. more than ten years ago. The only adverse return is from Oakland, which reports that it is now less practiced than formerly, since it is deemed "more profitable to let cattle and sheep eat the clover and plow under the

manure." The return from Cass says: "Our lighter sandy barrens, which, before the use of clover and plaster, very poorly paid for cultivation, have been raised to nearly first-class for profitable culture. The average of our grass-crops is fully 50 per cent. better than twenty years ago, and still increasing."

In Indiana the practice appears to be growing in appreciation in connection with both wheat and corn culture. In a majority of cases the stubble only is turned under. In Fulton, clover is regarded as "the great, indispensable fertilizer;" in Clinton, as "the economical mode of restoring lands;" in Madison, the full crop "improves the soil 40 per cent.;" in Marshall, the second crop for wheat increases the yield five to ten bushels per acre; in Switzerland, an experiment with corn, sown thickly, and turned under when knee-high, doubled the yield of wheat. "The yield was so surprising that the practice of green-manuring is likely to prevail to a much greater extent." In Posey, the clover, independently of its fertilizing effects, "pays a handsome profit."

From Illinois the only reported exception to uniformly favorable results is a partial one from Jersey: "Leaves the soil in good condition for corn, but for wheat, makes the straw weak, and the crop falls." Macon reports that the young roots supply the cut-worms with what they need, and save the corn. In Vermillion, the second crop ploughed under, after being partially fed off, increases the yields 30 to 50 per cent. In Hancock, the practice is on the increase, the stubble increasing the yield 33⅓, and the full crop 50 per cent. In Shelby, the second crop turned under produces the best and surest crop of wheat, and the seed comes up thick, making a first-class clover-field again. In De Kalb, the second growth turned under is "as beneficial as a generous coat of compost."

The practice has taken root in Wisconsin, but as yet has made comparatively little progress. Green Lake reports as follows: "The best results when clover is followed by corn well manured; then two or three crops of wheat with clover; some use a light seeding of clover and plaster with each crop of wheat, allowing the sheep to pick off the clover in the fall. Land treated in this way invariably improves." In Pierce, the first crop turned under results in great benefit to two or three succeeding crops of wheat.

So far as returns indicate, the practice has but little more than been introduced in the newer States of Minnesota and Iowa, though Jackson, in the latter, reports that the full crop turned under increases the yield of corn about 50 per cent. In Kansas, Nebraska, and California, where stable-manure is as yet generally regarded as a troublesome superfluity, the practice is scarcely known. In Missouri, out of over sixty returns, about one-third report the practice to some extent. In Chariton, the second crop turned under makes old, worn-out fields produce almost equal to new lands. In Boone, for wheat, it perpetuates the clover without the cost of seed or the labor of sowing again. In Stone, land on which the stubble is turned under produces a greater yield and better quality of wheat than any other. In Dent, "as the result of experience, consider it superior to barn yard manure;" in Grundy, also, "the result is rather ahead of barn-yard manure;" in Cape Girardeau, it is the most popular method of improving old fields; in Scott, the best fertilizer yet tried. The following extracts are specially suggestive:

Platte: Our practice in soil improvement is this: Sow tired land in wheat or rye in the fall; sow clover-seed on the same the following spring; let it remain in clover three or four years; then (turning under the second crop) put in wheat or corn. The yield of either will be almost double the amount that would be produced without

this process. *Callaway:* The most common mode is to graze the clover down after it blooms, or cut for hay two or three years, then plow under in August and sow in wheat. The best plan to enrich the land is to plow all under after the seed ripens and let it come up again in the spring. I know that this will enrich land very fast. *Howard:* In June, clover is cut for hay, or hogs turned on it, and so treated for several seasons. Then the aftermath is turned under in autumn, and a good crop of whatever is put in is sure to follow. *Lincoln:* The almost universal practice is to sow clover on winter-wheat in the spring; after cutting the wheat the stubble is pastured by hogs, cattle, and horses. The next spring no stock turned on before the clover is in bloom; then what is needed for home-consumption is cut, after which the hogs, cattle, and horses are again turned on. The third year the same process is repeated up to the 1st of August, when the ground is plowed and left to mellow till about the 20th of September. It is then planted in wheat, the drill being almost universally used. This practice insures a good crop of wheat and improves the soil. *Johnson:* The usual practice is to pasture with hogs, then turn under what they leave. One farmer, with some 15 acres of red clover and about 200 hogs, says: "That clover-field, for feed alone, is worth double the amount of land in corn, is good feed while there is no corn, and when I turn it under I get nearly or quite one-third more corn the first season than I should without it."

WINTERING FARM-ANIMALS.

The care of domestic animals involves considerations of increasing importance and complexity as civilized settlements advance over our continent, and as reliance upon the spontaneous products of the soil becomes more precarious. The necessity of providing in summer for the unproductive season of winter enforces a practical study, not only of the methods of increased production, but also of economical feeding. The inquiries of our March circular elicited a vast amount of specific information showing the practical treatment of these problems by American farmers. The field of inquiry being so extensive, embracing such a variety of climate, soil, and production, it was not at all surprising that wide differences in ideas and methods should be found in different regions. In every part of our country, except the extreme South and some portions of the Pacific coast, a portion of the year fails to yield fresh supplies of green food for farm-animals, necessitating the storage of dry food to tide over the winter. In a multitude of cases this obligation is imperfectly felt, and in many others entirely ignored. In some parts of the country farmers manifest a culpable inhumanity toward the brute creation, which is also a stupid disregard of their own interests, in failing to supply shelter and food for their farm-animals. The opposite policy, however, finds frequent illustration in the course of intelligent farmers in different States. These have discovered that true economy in live-stock production embraces a generous treatment of animals, and that in this case, as in all others, true interest is associated with humanity and duty.

In interpreting the general results of our March inquiries, attention will first be directed to the feeding-material provided for the support of farm-animals during the inclement season. The most natural food of cattle and sheep is grass, green in summer and cured into hay for winter. Horses, milch-cows, and swine are generally provided with a more or less liberal allowance of grain, and in some cases roots to a very limited extent. The great staple of winter-provision, however, is hay, which, in different parts of the country, exhibits a very great variety, both in its material and mode of curing.

CONSTITUENT PROPORTIONS OF THE HAY-CROP.—In New England the cultivated grasses proper cover from two-thirds to three-fourths of the hay-fields. Of these, timothy (*Phleum pratense*) is the prevail

ing element. This grass is also called herd's-grass in New England and New York. Red-top (*Agrostis vulgaris*) and occasionally orchard-grass (*Dactylis glomerata*) are cultivated by farmers for hay; not often as separate crops, but mingled with timothy. Blue-joint (*Calamagrostis canadensis*) is casually mentioned as growing in some meadows in Maine. Of fodder-plants, besides grasses, red clover, (*Trifolium pratense*,) white clover, (*T. repens*,) and alsike clover (*T. hybridum*) receive some attention, but are seldom found growing alone. In Maine and Vermont, clover constitutes about one-sixth; and in New Hampshire, probably one-fourth of the crop; in Massachusetts, Rhode Island, and Connecticut, it receives less attention. Wild grasses from salt or fresh meadows furnish about one-fourth of the hay-crop.

The Middle States manifest a preference for clover-crops, which cover nearly a third of the hay-fields. The largest proportion of hay from wild grasses is made in Pennsylvania, amounting to about 20 per cent. of the whole; in New Jersey it constitutes less than one-eighth of the crop, and in New York about one-sixth. Of the cultivated grasses, timothy is the chief reliance, though mingled with orchard-grass, blue-grass, (*Poa pratensis*,) Hungarian-grass, (*Panicum Germanicum*,) and red-top. Red-top, in Pennsylvania and in regions to the south and west, is frequently called herd's-grass.

Of the South Atlantic States, our returns indicate that probably the larger portion of the hay-crop of Maryland is made from clover, while a smaller proportion is from wild or natural grasses than in the New England or Middle States. In Virginia, timothy and clover are in about equal use, while wild grasses come in for a much larger share of the hay-crop than in Maryland. Of cultivated grasses proper in these two States, timothy is the staple, with an occasional mixture of orchard-grass and red-top. Passing down the coast, our correspondents in the Carolinas and Georgia made very few efforts to classify the grasses used for hay-production. Experimental culture with grass and clover seeds from the Department has been successful in the hands of some progressive farmers, but the idea of raising grass for hay to feed stock during the short southern winter has enforced itself upon but few minds in that section. Crab-grass, a term applied to different species in different parts of the South, is often cured into hay. Pea-vines have also, of later years, been dried for winter-use. The same remarks apply also to the Gulf States, though in some localities the experimental culture of German millet, perennial rye-grass, (*Lolium perenne*,) alfalfa, or lucerne, (*Medicago sativa*,) Kentucky blue-grass, &c., has been attempted with variant success. Several southern native grasses have occasionally been subjected to partial curing. Careful experiments are needed to show how far these grasses are available for winter stock food.

In the inland Southern States grass-culture reappears. Arkansas and Tennessee show a large proportion of clover, while the wild grasses are less used for hay-production than farther South. Timothy, red-top, millet, Italian rye-grass, (*Lolium Italicum*,) Hungarian-grass, orchard-grass, blue-grass, and other species and varieties approximating those of the northern States, are noted in many counties. This approximation to northern grasses is still more apparent in West Virginia and Kentucky. The last-named State is the genial home, *par excellence*, of the famed blue-grass (*Poa pratensis*.) In the two States last named the proportion of clover ranges from a fourth to a third of the entire hay-crop.

North of the Ohio River the cultivated natural grasses yield more than half the hay-crops of Ohio, Indiana, and Illinois, while the proportion of

wild grasses increases in Michigan and Wisconsin; clover occupies from a fourth to a third of the hay-fields, either separately or mingled with timothy, which is here, as in the Eastern States, the special favorite among the cultivated grasses. Blue-grass, red-top, Hungarian-grass, millet, orchard-grass, blue joint, &c., claim attention in many localities.

West of the Mississippi River, Missouri has learned to discard the wild grass, as a hay-crop, to an extent unknown in other States of this region. In Iowa seven-tenths, in Minnesota eight-tenths, and in Kansas and Nebraska over nine-tenths of the hay-crops, are made from indigenous grasses.

On the Pacific coast the alfalfa, capable of resisting severe droughts, promises a special adaptation to peculiar climatic conditions. Large amounts of forage are also made from volunteer crops of grain—oats, wheat, and barley—which are mowed and cured in the same manner as timothy and clover in the Eastern States. No culture of white or red clover of any extent is found either in California or in Oregon. In the latter State timothy is found a profitable crop in many sections. Wild hay is also used in these States as well as in the newly-settled Territories, whose capacities for grass-culture and hay-production are not yet tested by experiment. Among the few attempts at grass-culture on these new soils, timothy enjoys about the same pre-eminence as in the older States. Occasionally alfalfa and red-top are spoken of; red or white clover very seldom.

Duration of the feeding-period.—The length of time in which the farmer expects to keep his animals upon dry feed of course varies with the latitude, but this general variation is also affected by local circumstances. In New England the average length of the feeding-period is about six months, commencing between the 1st and the 15th of November. Partial feeding lasts from one and a half to two months longer. Contrary to expectation, our returns show a larger average feeding-period in several of the southerly counties than in those farther north.

In the Middle States the average period of full feeding ranges from four and one-third months in Delaware to five and one-fifth in New York and New Jersey, Pennsylvania averaging about five months. In these States partial feeding lasts from one and a half to two months in addition. Maryland gives full feed about a fortnight longer than Delaware; Virginia about four months; North and South Carolina about three and one-half months; Georgia averages a little longer period. In these South Atlantic States partial feeding lasts over two months. Of the Gulf States, Florida and Louisiana scarcely recognize a winter-feeding-period. In Alabama, Mississippi, and Texas farm-animals (that are fed at all, for most are left to the range or cane-brake) are fed from three to three and a half months in full, with partial feeding for two to two and one-half months longer.

In the inland Southern States the average full feeding is about three and one-third months in Arkansas and four and one-third months in Tennessee and West Virginia, with about two months' partial feeding. Kentucky averages a somewhat longer period both for full and for partial feeding.

Ohio, Indiana, and Illinois being very nearly within the same climatic parallels, and with a small difference of elevation above sea-level, average nearly the same, about four and a half months' full feeding and a little over two months of partial feeding. The northern counties of Illinois, however, somewhat enlarge the average for that State. Michigan, Wisconsin, and Minnesota range from five and a quarter to five and

a half months' full feed, with a little less than two months of partial feeding. Iowa, with its more southern latitude, averages but little less than Minnesota, while Nebraska, though higher up the declivity of the Rocky Mountains than Iowa, reports a shorter average full-feeding period, only five months, with about two and a half months' partial feeding. Missouri and Kansas average about four and a half months' full feeding and two and a third partial feeding. On the Pacific coast it is difficult to average the statements of our correspondents on account of different usages in different localities. In most cases, wintering stock, in the sense of that term in the Eastern States, is unknown. Even in Oregon, a mild winter or rather rainy season supplies farm-animals with a full proportion of nutritious grasses, thus relieving the farmer of one of his heaviest cares. Of the Territories, only one county in Colorado reports stall-feeding, and that not over a month. In Utah it ranges from three to five months; in Washington very little, if any; in Dakota from two to five months. No particular feeding-period is noted in any of the other Territories.

KIND OF FEEDING-MATERIAL.—The staple of winter-feeding throughout the country is hay, either timothy or clover; but the demand for this material in the towns and cities induces farmers in many portions of the country to stint their own animals in order to realize the high prices it commands. Hence there is a great effort to supplement it with other products. Corn and oats are also fed to work-animals in nearly all the counties reporting in different States of the Union. In many of them grain is given more or less freely to milch-cows and to animals fattening for market. In quite a number of counties grain is fed to stock-cattle and to sheep, but these are communities of advanced ideas on the subject of stock-raising.

In New England, corn-fodder, wheat, oats, and rye-straw, wild hay, salt hay, and other organic matter are used to save hay and corn. One adventurous correspondent in Maine has tried feeding flour to cattle, but is not at all encouraged by the financial results of the experiment. Millions of bushels of western corn are used in feeding animals. Grain is fed to work-animals in all the counties reporting from this region; in many, to milch-cows, especially in the dairy-regions; in some few, to all kinds of stock.

The New York farmers practice a more general feeding of grain to all kinds of stock, especially toward the close of the winter. In addition to timothy and clover hay, straw, pumpkins, millet, Hungarian grass, corn-fodder, especially from sowed corn, and other supplementary materials, are pressed into service. New Jersey consumes about all her corn-crop on the farm, and uses about the same kinds of food previously enumerated. There is an increased amount of grain-feeding to all classes of animals. Pennsylvania produces a larger corn-crop. A generous winter-feeding is gaining ground in many counties. A careful use is also made of straw, corn, fodder, pumpkins, mill-stuffs, &c. Delaware being more exclusively agricultural, and with a smaller number of large towns and cities, is able to spare nearly or quite half of her corn-crop for market. There is here also a variant usage in regard to grain-feeding; in some cases corn and oats are exclusively given to work-animals, and in others also to cattle and sheep.

The same may be said of Maryland, where, however, a more enlightened policy leads to a more generous support of farm-animals. Nearly a third of the corn-crop is marketed, the remainder being consumed on the farm. Virginia sends about one-sixth of her corn-crop to market,

and supplements her hay-crops with corn-fodder, pea-vines, straw, &c. In North Carolina crab-grass hay is added to the other materials; 89 per cent. of the corn-crop is consumed at home. South Carolina adds to the miscellaneous list turnips, cotton-seed, rice-straw, rice-bran, &c. In this South Atlantic coast region the tendency to allow inferior classes of animals to shift for themselves during the winter-season is more observable in the lower latitudes. Florida also uses a miscellaneous list of semi-tropical materials to supplement hay and corn. The Gulf States generally use the same class of feed as Florida. Work-animals appear to be generally fed upon grain, but to other classes it is, as a general thing, given sparingly if at all.

Tennessee uses 86 per cent.; West Virginia, 92 per cent.; Kentucky, 87 per cent. In addition to hay and corn, these States use large quantities of corn-fodder, Hungarian-grass, straw, millet, &c. A more copious grain-feeding is practiced than in the States farther South. Work-animals, fattening-cattle, and milch-cows receive the most of this nourishment, but stock-cattle and sheep are also fed in many places.

So far as indicated by the counties reporting—for it is not given as the exact average for the entire crop of the State—Ohio feeds 82 per cent. of her corn-crop in counties where it is grown; Michigan, 89 per cent.; Indiana, 80 per cent.; Illinois, 73 per cent.; Wisconsin, 91 per cent. The hay-crop is supplemented by about the same materials as in the Eastern States within the same parallel. There is the same difference also in the liberality with which grain is dealt to different classes of animals; the tendency is toward a more rational and generous diet.

West of the Mississippi, Minnesota consumes at home 98 per cent. of her corn; Iowa, 75 per cent.; Missouri, 92 per cent.; Kansas and Nebraska, 93 per cent. In the two States last named this statement should be taken of average years. The grasshopper devastations last year materially reduced the crop. They almost entirely absorbed the surplus. In the older-settled parts of this region the tendency is to feed more grain to stock of all kinds, while in the newer settlements the traditional pioneer policy of partial starvation still prevails.

On the Pacific coast the volunteer crops of grain furnish a very nutritive forage when mowed and cured as hay. Corn is not a very abundant crop in that region, and hence but a small quantity finds its way to market. In some cases barley is used to fatten hogs. In some parts of Oregon hay is only given to poor cows, those in better condition being able to forage for themselves. A few counties in the Territories provide grain for live stock; others utilize straw, fodder, and other vegetable matter, but in most of our reports it is stated that animals are turned upon the range to shift for themselves during winter.

Cost of wintering.—*Horses:* In New England the cost of wintering horses is greatest in Rhode Island. This fact may be explained by the proximity of the agricultural regions to the town and city markets. The farmers in this State obtained higher prices for hay and corn during the last year than in any other State in the Union; hay there averaged $24.66 per ton; corn $1.18 per bushel, and oats 73 cents. The averages of States were as follows: Maine, $37; New Hampshire, $37; Vermont, $38; Massachusetts, $45; Rhode Island, $48; Connecticut, $45.

These figures are made from the averages of counties reporting, with due reference to the prices of feeding-material in those and in the remaining counties.

In the Middle States the maximum cost of wintering horses, $48

per head, is in New Jersey; next in order stand Delaware, $43; New York, $37, and Pennsylvania, $36. Delaware farmers, last year, received the highest average price for hay, $20 per ton, and those of New York the lowest, $13.10. New York received the maximum price for corn, 93 cents per bushel, and Delaware the minimum, 70 cents. The price of oats ranged from 52 cents in Delaware to 60 in New Jersey.

Of the South Atlantic States the highest average cost is in Maryland, $34 per head; next Georgia, $28; South Carolina, $24; Virginia, $22; North Carolina, $21. The farm-prices of hay ranged from $14.83 per ton in North Carolina to $23.83 in South Carolina; of corn, from 64 cents per bushel in Virginia to $1 in South Carolina; of oats, from 54 cents per bushel in Virginia to 91 cents in South Carolina.

Of the Gulf States, Florida seems scarcely to know anything of the necessity of wintering animals. One correspondent rather dubiously assigns $10 per head as the cost of wintering horses. Louisiana averges $18 per head; Texas, $20; Alabama, $22; Mississippi, $26. Florida farmers not raising any hay, our correspondents were unable to name any price obtained for it; Texas averaged $10.92 per ton; Alabama, $17.50; Louisiana, $20; Mississippi, $21.09. Corn ranged from 75 cents per bushel in Texas to $1.01 in Mississippi; oats from 84 cents per bushel in Texas to $1.02 in Mississippi.

Of the inland Southern States the average expense of horse-keeping through the winter averaged $20 in Arkansas, $21 in Tennessee, $18 in West Virginia, and $19 in Kentucky. Hay brings from $14.12 per ton in Arkansas to $19.08 in Tennessee; corn from 55 cents per bushel in Kentucky to 95 cents in Arkansas; oats from 53 cents per bushel in West Virginia to 92 cents in Kentucky.

North of the Ohio River the expense of horse-wintering averages $25 in Ohio, $28 in Michigan, $20 in Indiana, $19 in Illinois, $34 in Wisconsin. The farm-prices of hay ranged from $10.07 per ton in Wisconsin to $17.82 in Ohio; corn from 51 cents per bushel in Indiana to 65 cents in Michigan; oats from 44 cents in Indiana to 50 cents in Michigan.

West of the Mississippi the average cost of wintering ranges from $9 in Kansas to $28 in Minnesota; Iowa averages $16, Missouri $15, and Nebraska $13. Farm-prices of hay vary from $3.86 in Kansas to $12.05 in Missouri. The cheaper hay of Kansas and Nebraska is mostly made from the wild grasses of the prairies. Corn ranges from 43 cents per bushel in Iowa to 91 in Kansas, and oats from 38 cents per bushel in Iowa to 53 cents in Kansas. The high prices of grain in Kansas and Nebraska are largely the result of the grasshopper-devastations and the drought.

On the Pacific coast winter-feeding of live stock is scarcely known. One correspondent in California speaks of hiring pasture at from $1 to $1.50 per month. Another states that only in the wetter portions of the rainy season are farm-animals housed and stall-fed. At such times the cost of hay-feeding per month is about $5. Another states that green pasture lasts all through the winter. Work-animals are fed grain only when at work. Very little corn is raised, but oats and barley in considerable quantities. The same facts are reported as a general thing by our Oregon correspondents. Only their stock-cattle and poor cows are, in many places, treated even to hay; the hardier and better-conditioned animals take very good care of themselves upon the range. Farm-prices of hay in California, $15.09; in Oregon, $11.50; corn 98 cents per bushel in California and 94 cents in Oregon; oats 69 cents in California and 42 in Oregon.

In Colorado wintering horses costs from $5 to $25 per head; in Utah

from $10 to $50; in Dakota from $6 to $30. In our reports from the other Territories no estimates are given.

Milch-Cows: The cost of wintering milch-cows in New England varies from $23 per head in New Hampshire to $38 in Massachusetts; Maine averages $29; Vermont, $25; Rhode Island, $30; Connecticut, $37.

The Middle States average $24 in New York, $29 in New Jersey, $23 in Pennsylvania, and $26 in Delaware.

The average on the South Atlantic seaboard is $20 in Maryland; $11 in Virginia; $10 in North Carolina; $15 in South Carolina, and $14 in Georgia.

In the Gulf States our Florida correspondents report no averages, inasmuch as the cows there find pasture during winter. Alabama averages $10 per head; Mississippi, $8; Louisiana, $7; Texas, $6. These figures, as well as those for other Southern States, of course, refer to those animals that are "wintered" at all, and not to the far greater proportion left to find pasture as best they can. This wintering also means only occasional or partial feeding.

Of the inland Southern States, Arkansas reports $9; Tennessee, $16; West Virginia, $12; Kentucky, $17.

North of the Ohio River the average cost in Ohio is $16; in Michigan, $25; in Indiana, $15; in Illinois, $15; in Wisconsin, $21.

West of the Mississippi, Minnesota reports $13; Iowa, $11; Missouri, $11; Kansas, $6; Nebraska, $7.

On the Pacific coast, cows are generally pastured during the winter, and the amount of stall-feeding is too small for a reliable estimate.

In Colorado the cost of feeding cows is estimated from $7.50 to $40; in Utah from $9 to $45; in Dakota from $3.50 to $12.

Sheep: To winter a sheep in Maine costs about $3 per head; in New Hampshire, $2.50; in Vermont, $2.50. In Massachusetts the aggregate of these animals is too small and the individual flocks too scanty to give a basis for estimate. Rhode Island and Connecticut return very high rates.

The average cost in New York is $2.50; in New Jersey and Pennsylvania, $2; in Delaware, $2.75.

In Maryland the average is $2.75; in Virginia, $1.50; in North Carolina, $1.30; in South Carolina, $1.70; in Georgia, $1.50.

Florida has too few sheep to report on. In Alabama the cost of wintering is $1 per head; in Mississippi, 75 cents; in Louisiana, 50 cents.

In Arkansas the average is $1.07; in Tennessee, $1.66; in West Virginia, $1.21; in Kentucky, $2.07.

Ohio reports $1.75; Michigan, $1.90; Indiana, $1.60; Illinois, $1.55; Wisconsin, $2.

Minnesota averages $1.90; Iowa, $1.60; Missouri, $1.40; Kansas, $1.20; Nebraska, $1.

On the Pacific coast, sheep shift for themselves on the winter pastures.

These figures show the varying influences not only of different climates and soils but also of local circumstances. In the smaller New England and Middle States the agricultural area bears a smaller proportion to the number of commercial and manufacturing cities, and hence, consumption being in excess, the prices of hay and grain are enhanced and consequently the expense of wintering is greater. This explains the fact that the maximum expense of horse-wintering is in Rhode Island and New Jersey, and the minimum in Florida and the Pacific coast, where the winter months do not entirely arrest vegetation, and where the supply of green food is almost perennial. The highest cost of wintering

cows is in Massachusetts and the lowest in Kansas. The cost of wintering sheep is greatest in Massachusetts and least on the Pacific coast. The quantity and quality of fodder, roots, wild hay, and other supplementary feeding-matter are undetermined elements in the problem of winter-feeding of live stock.

Increased Value.—Nearly all the States report some increase in value in all classes of farm-animals from winter-feeding. The only decrease in the value of horses is in Michigan, in which several counties report an exceptional demand in the fall for horses, causing an increase of values at that period of the year. Cows and sheep are of lower average value in spring in Mississippi and Louisiana; cows scarcely hold their own in Delaware.

In New England the margin of differences is narrower in those counties where animals are expected to pay their expense of wintering by work or by yield of milk. Horses in the neighborhood of Boston bear a high average value, subject to trifling fluctuation in different parts of the year. In the rural districts, however, where the winter-keep of animals is very partially compensated by use, there is a very considerable difference in their value before and after wintering. This increase of value amounts in some cases to over two-thirds the cost of the food consumed, but the average is less than that. The value of the manure produced is an unascertained factor in the problem of wintering stock, and is of variable influence upon the general result, from the fact of its different treatment in different localities. The largest rate of increase of values of horses and sheep is in New Hampshire and the smallest in Massachusetts; of cows, the greatest is in Vermont and the smallest in Massachusetts.

The Middle States illustrate the same general principles. In New Jersey the proximity of the great commercial and manufacturing cities, New York and Philadelphia, besides several large cities within her own limits, gives rise to more winter employment for work-animals, which renders the high cost of feeding of less importance in enhancing spring values. Animals steadily worked do not come out of winter quarters in as high condition as those stabled and fed. Hence in this State is found the narrowest margin of increase in the value of horses, while the maximum is found in Delaware, where the opposite class of conditions prevails. A medium range of increment is found in New York and Pennsylvania, whose large areas are less within the scope of those urban influences. A larger proportion of the cows in New Jersey are kept for the winter supply of milk for the cities, the increased price of which, during that season, is intended to cover the cost of keeping. Delaware reports little, if any, increase of value, a fact which does not speak favorably for the care of milch-cows in that State. New York and Pennsylvania show greater margins of increase, from the fact that a smaller proportion of their cows are productive during winter. New Jersey fattens a large proportion of her sheep for the meat-market; hence the actual increase of mutton causes an average increase of over 60 per cent. in the counties reporting. The other States of this section report very considerable margins, but less than New Jersey.

On the South Atlantic seaboard, our correspondents, in counties neighboring to Baltimore, decline to give estimates on this point, a fact which indicates no great difference between fall and spring values. Of other counties in Maryland it is noticeable that the greatest difference is in Montgomery, on the Potomac River. In Virginia, Accomac, on the coast, reports but 10 per cent., while Mecklenburgh, on the south border and considerably distant from the sea, presents the greatest dif-

ference—33 per cent. In North Carolina, Pasquotank, on the coast, increases her values in spring but 10 per cent., while Duplin, in the interior, shows 40 per cent. In the other States of this region, and in the Gulf States, our reports show about the same range of facts in regard to horses; but in regard to cows and sheep the figures represent only that small portion of the animals that are fed during winter, and do not warrant general conclusions. Their money-value is too often depressed in the spring through poverty of condition, caused by partial starvation.

The inland Southern States exhibit higher ideas in the care of live-stock, and exhibit fewer instances of that gross neglect so general in the far South. The estimates of difference between fall and spring values seem to be more reliable, but are subject to local variations. Counties in different parts of Arkansas and Tennessee report no difference of value, while in neighboring counties margins of 20, 25, and 30 per cent. are presented. It is noticeable that in Kentucky there are no counties which do not show some difference; yet the average of the counties reporting is less than in the other States of this region.

North of the Ohio River, several counties report the money-value of horses at its maximum in the fall, on account of the greater local demand at that season. In a few other counties there is no increase of value, but in most cases there is a considerable difference. Of the counties reporting, Ohio presents the largest average difference of values of horses, Michigan of cows, and Wisconsin of sheep. Here, as in the States east of the Allegheny Mountains, our correspondents in the vicinity of large cities leave this part of their reports blank.

West of the Mississippi River, all counties reporting show some difference in fall and spring values. Minnesota shows the greatest increase in horses and Missouri the least; in cows, the greatest increase is shown by Nebraska and the smallest by Missouri; in sheep, the maximum increase is found in Kansas and the smallest in Missouri.

On the Pacific coast our correspondents seem reluctant to commit themselves to definite estimates. Local variation is also considerable, and enhances the difficulty of coming to general conclusions.

Gain or loss of weight in wintering.—In Maine, horses, being relieved from heavy work and adequately sheltered, show an increase of weight and an improvement of condition in spring, as also do milch-cows and cattle fattening for market. This, however, is the general rule in all parts of the county, especially in regard to work-animals; but in regard to stock-cattle and sheep, the exception becomes the general rule. Maine, New Hampshire, and Vermont show some decline on the whole. In Massachusetts, Rhode Island, and Connecticut, in spite of the higher cost of feeding-material, all classes of farm-animals are kept nearer their normal condition, because most of them are kept either for work or milk.

Our correspondence in New York presents a considerable variety of treatment of animals. Several counties report an absolute gain in weight, but the larger number acknowledge a decline. Even horses, in some cases, decrease from 50 to 100 pounds per head during the winter; cattle lose from 25 to 75 pounds; sheep from 10 to 15. Dairymen generally keep up their cows on grain, but the cows of other parties decline to a greater or less extent. In New Jersey the condition appears to be more generally kept up. The general practice in Pennsylvania falls below several admirable examples in different parts of the State. In Lancaster County it has been tested that good feeding will make a steer of 1,200 pounds, worth 5 cents per pound in the fall, weigh 1,600 pounds in the spring, and bring 7 cents per pound—a gain of $52, very largely

overbalancing the cost of winter-feeding and care. In Delaware all animals except horses decline in weight.

In Maryland there is also a decline, more perceptible in those counties in which poor shelter is the rule; the loss of weight ranges from 5 to 15 per cent. Down the Atlantic coast the rate of loss increases—cause, neglect. In Virginia, while horses almost hold their own, cows and sheep show losses from 10 to 40 per cent.; yet in some cases it is reported that fed animals increase 2 pounds per day. The depreciation of farm-animals grows still more marked in North Carolina, South Carolina, and Georgia, the decline of stock-cattle in several counties reaching an average of 50 per cent.

In Florida the winter-grass is abundant, though not very fattening; even in this mild climate it is reported that in many places it is esteemed lucky if cattle and sheep survive the winter. One correspondent in Alabama estimates the average loss of weight in cattle and sheep in his county at over 60 per cent. Another presents a pathetic picture of the faithful family cow "shivering herself away in the beating rains and winds," with no shelter except a fence-corner. "Sheep are not seen for weeks, and are very unwelcome visitors at the farm-yard, especially during cold sleeting weather." In more than one county of Mississippi cattle and sheep die of starvation. A less wasteful system appears in Louisiana and Texas, yet here are many flagrant cases of neglect, entailing terrible losses upon cattle and sheep.

In Arkansas the percentages of decline are less, though in one or two cases they amount to 30 per cent. In Tennessee the improvement is still greater. In West Virginia and Kentucky the average loss declines to 10 or 15 per cent., though some flagrant exceptions are noted.

There is an approach to normal condition in many counties of Ohio, where the rate of decline varies between 1 and 10 per cent., with isolated cases of greater loss. The value of good shelter is practically realized in the absence of decline and increase of weight in several counties. In Ross three and four-year old cattle under shelter gain from 200 to 300 pounds, but only 10 per cent. of the cattle are adequately sheltered. Here two-year-old stock, only half fed, will gain from 5 to 10 per cent. if sheltered. Most of the counties in Michigan report greater or less decline, though several maintain a good average. The loss in some cases amounts to 25 per cent. In Indiana there is a greater net decline of weight upon the whole. In Illinois the range of decline is about the same. Our reports from Wisconsin, less numerous than usual, show a generally better condition at the close of the feeding-season. In Waukesha County it is recommended that sheep be fed hay in yards surrounded by a tight board fence 6 feet high, and copiously littered with straw every two or three days.

In Minnesota the highest average decline does not exceed 10 per cent. In some counties of Iowa old stock falls off about 20 per cent., but this is partially balanced by the increase of younger animals. Cows generally lose; sheep and stock-cattle show a still greater decline. The average loss probably does not exceed 10 per cent. in any county. In Minnesota the range of cattle and hogs is between 40 per cent. gain and 40 per cent. loss. One correspondent is very severe on slipshod farmers, who are satisfied if animals can just kick in the spring. The better class of farmers, who, however, are in the minority, do not allow their animals to lose weight. In Kansas the rate of loss has been greatly increased by the devastations of grasshoppers, though in Crawford County live-stock have done exceptionably well. In Franklin, on the other hand, there was a fearful loss in the spring. In some counties the price

of animals declines toward spring, from the fact that their owners, having laid in too short supplies, are anxious to sell. In Lyon ordinary horses and cattle lose 25 per cent. in weight; wintered on prairie-grass alone, they lose 40 per cent., and 25 per cent. of them die. The general tone of the reports shows a serious decline. In Nebraska, with the same causes operative as in Kansas, the range of loss is much narrower, seldom exceeding 20 per cent. On the Pacific coast there is a general falling off of weight during winter, the loss of some counties reaching an average of 20 per cent. To this, however, there are exceptions. In San Joaquin, Cal., stock of all sorts held their own and looked well at the close of winter. Our Oregon reports indicate a decline, though the rate is not estimated.

In the Territories are found some localities with mild climate and abundant winter-grasses where, in ordinary seasons, live stock do well. But in most cases reported there is a decline in weight amounting, in several counties, to one-third. In years of unusual severity the losses of farm-animals are appalling. The merciful policy of good food and shelter will yet be found the most profitable.

Our March returns afford unwelcome evidence of the fact that American farmers, as a rule, calculate that their farm-animals, with the exception of working-stock, milch-cows, and animals fattening for market, shall come out of winter-quarters reduced in weight and depressed in condition. Numerous exceptions are found in the older States, where the higher economies of farming have begun to enforce attention, but these exceptional cases constitute a minority even in their own sections. A few farmers in the West and South illustrate this general policy of depletion by its extreme but legitimate results. The care of stock-cattle and sheep, and often of milch-cows, is a responsibility which they calmly cast back upon Providence, caring very little for the suffering inflicted upon their brute dependents, whose gaunt frames and uncomplaining misery awaken no sentiments of pity or compunctions of conscience. Their shriveled carcasses are allowed to rot upon the range, or are hastily removed from the field without even suggesting any idea of personal responsibility for this waste of animal life. The number of such farmers, in whom a blind and stupid greed has paralyzed the sentiments of humanity, is happily small, and growing smaller as the true principles of production become better understood.

But leaving out of view such extreme cases, the facts elicited by our March returns give considerable ground for sundry sharp criticisms by foreigners upon this branch of American farming, criticisms which one of our leading writers is compelled to acknowledge as just. The general disposition to allow farm-animals to decline in weight and condition during winter-feeding springs from inconsideration and neglect rather than from any lack of humane feeling. It is based upon a false economy. The food necessary to keep up the standard of condition during winter will be much less than that which will be required to restore the depleted carcass in the spring. A very considerable proportion of the loss of weight of animals during winter results from wasteful feeding and lack of shelter. The drafts upon the animal heat and vitality of unsheltered beasts amount to a third or a half more of feeding-material than would keep them in good condition under cover. But few, if any, of the farmers who expose their animals to the inclemency of the season make any extra provision of food; they seem rather to diminish the feeding in proportion to the exposure. Even the pittance doled out to animals wintered in the field is largely wasted by improper management.

The first great reform suggested by our returns is the enlargement of the stock of winter-food by the increased production of hay and other feeding-material. It is true economy to utilize straw, fodder, and other vegetable matters upon the farm, but these are generally deficient in some of the elements of nutrition, and need to be supplemented with hay or grain. Our grass-crops present but small returns for the surface they cover and the capital and labor invested. The State of New York, for example, scarcely averages a ton of hay per acre. Yet few of her farmers would think of entering a crop, for competition at any agricultural fair, of less than two or three tons per acre. With the same acreage, then, it is possible to double or triple our hay-crop by bringing up the practice to what has been shown to be practicable. Our pastures, which are more than double the area of our meadows, should be stocked with a better class of grasses. Experiments should be made with our indigenous grasses, especially with reference to the curing of hay for winter. It is believed that intelligent effort will yet make two spears of grass grow where one grows now. With such an enlarged basis of vegetable matter, it will be easy to supply our farm-animals with the amount of food necessary not only to keep up their standard of weight, during winter, but also to increase it.

But other reforms must be inaugurated. It is necessary to administer the food provided for animals with intelligent reference to its nutritive qualities and to their peculiar wants. Experiments should be made under scientific authority, showing the specific values of different kinds of food, and the results, carefully gathered and compared, should be placed within the reach of all our farmers. German farmers carefully follow the directions for feeding founded upon the latest experiments of the government agricultural stations. Some such scientific authority is pressingly needed to direct the practice of American farmers.

Finally, the cruel and wasteful policy of exposing farm-animals to the inclemency of the winter should be abandoned, even in our southern climates. These reforms are demanded not only by the spirit of humanity, but also by intelligent economy in production. Our farmers are called upon to furnish the markets with higher grades of animals and animal-products. To meet this demand, the hap-hazard, wasteful methods which characterize extensive regions of our country must be superseded and more intelligent and effective processes introduced.

LOCAL EXCHANGES OF FARM-PRODUCTS.

The principal cash-bringing crop in Maine is the potato, nearly every county producing a surplus, which is shipped to Boston, the manufacturing cities accessible to the coast, and to more distant markets. It is often found that two bushels of potatoes will bring more than a bushel of corn, and more than three bushels to one may easily be grown, so that exchange of potatoes for corn is common, though the thrifty sunrise farmer sells somewhat more than he buys, and thus makes two dollars grow (in the savings bank) where one grew before. Hay is another product that bears a good price, and all points accessible to navigation, or to short railway carriage, spare a limited amount, at the risk of the sustained fertility of the acres producing it. Some oats are also shipped. Aroostook, having a cool, moist atmosphere, in which this plant delights, sends off 25,000 bushels annually. In some counties there is a surplus of meat-supplies: 10 per cent. in Piscataquis and Cumberland, a respectable fraction in Waldo and Androscoggin, 60 per cent. of cattle and sheep in York, three-fourths of the beeves of Franklin, large numbers

of cattle and sheep in Aroostook, and more or less in all the counties mainly agricultural in population. In Hancock a surplus of 600,000 eggs is sold. Some young or store cattle are purchased, a few sheep, and some improved stock of various kinds for breeding. Corn and flour are very generally imported, and pork to less extent. The percentage of home consumption of flour is high in some portions of the State, amounting to 99 per cent. in Sagadahoc, 90 per cent. in Androscoggin and Cumberland, 75 in Piscataquis, the proportion declining to 20 in Aroostook. The town and village population obtain such supplies from other States almost exclusively, and a large proportion of the farmers are equally dependent upon the cereals of the West.

Potatoes are also the main reliance of the New Hampshire farmers; milk is prominent in the vicinity of large towns; butter and cheese are produced in interior dairies; apples produce in bearing years a fair revenue in Hillsborough and southern counties, and maple-sugar yields small gains in spring to nearly all sections. Veal, lamb, some mutton and beef are also sold. Corn, for feeding horses and fattening other animals, is largely brought from the West, together with nearly all the flour used in the State.

The surplus of Vermont consists in improved breeds of horses and sheep, butter of high repute, some cheese, poultry, eggs, potatoes, hay, maple-sugar, onions, and various vegetables and fruits. Most of the flour used is brought from other States, and much corn for feeding and fattening village and farm stock. Essex, bordering on New Hampshire and Canada, sells half the horses raised, half the mutton and beef, some hay, potatoes, oats, and maple-sugar.

As Massachusetts grows less than a quart of wheat to each inhabitant, flour must be sought from other fields. Nor could it be expected that 72,810 persons in rural pursuits could furnish bread for 579,844 engaged in all occupations, besides the children under ten years of age and other non-producers. And yet a large proportion of the vegetables, the milk and fruits, and some portion of the veal and lamb and other meats consumed, are home products. Some products are sold to go out of the State; a considerable quantity of tobacco in Franklin, Hampshire, and Hampden; cranberries in Norfolk, Plymouth, and Barnstable; onions in Essex and elsewhere; lettuce is sent from Suffolk to New York City. In Hampden the tobacco is manufactured before it is sent out of the county.

Little Rhode Island sells onions and potatoes, and some gilt-edged butter, though large supplies from abroad of all the cereals and meats are required in the manufacturing counties.

Connecticut produces eight to ten million pounds of tobacco, much of which, in the leaf or manufactured, goes elsewhere. Hartford grows two-thirds of it all. Litchfield and the whole Housatonic Valley sends large quantities of milk to New York, much veal, poultry, and eggs, some cheese, potatoes, and fruit. In this county are kept 23,000 cows, yielding $1,000,000 per annum in dairy-products. Hartford County imports three-fourths of her breadstuffs and nine-tenths of her meat-supplies. Windham sends milk to Boston and Providence. Onions, garden-seeds, and other special crops are largely sent abroad. Young stock, cows, and steers for feeding are brought from other States to some extent.

The dairy is an important element in New York agriculture. Herkimer, Jefferson, Saint Lawrence, Montgomery, Oneida, and Oswego, each producing from one to five million pounds of cheese, are quite as celebrated for that product as the following are for butter production, each

of which manufactures three to eight million pounds of butter: Saint Lawrence, Delaware, Chenango, Chautauqua, Jefferson, Oneida, Otsego. These are the heavy-weights in the production of the dairy-products of New York. The cereals are principal products in Genesee, Onondaga, Cayuga, Livingston, Monroe, Niagara, Ontario, Seneca, and Orleans, and shipped in some cases beyond county-lines. Hay is shipped sparingly. Hops help the revenues of Madison, Oneida, Otsego, Schoharie, which usually produce more than half the crop of the State. Potatoes contribute largely to the resources of Washington, Rensselaer, Saratoga, Saint Lawrence, Franklin, Schenectady, Suffolk, Kings, Queens, Westchester, and other counties. Hay and straw are shipped from Dutchess, and hay to some extent from many other counties, among which are named Lewis, Franklin, Columbia, Wyoming, Fulton, Onondaga, and Schenectady.

New Jersey, from its location between the two great cities of the continent, depends largely upon the products of the garden and orchard as money-crops. Much of the milk of New Jersey dairies is sent to market unmanufactured, yet butter is sold to a limited extent. It is one of the special products of Hudson and Sussex. The meat-production is veal, spring-lamb, mutton in autumn and winter, and beef to a limited extent. Most of the New Jersey stock of sheep is changed yearly. The common custom is to purchase in August, feed and fatten the wethers till Christmas, keep the ewes for lambs, market the fleece in June, sell the lambs at four months for more money than the sheep cost, and make good mutton of the ewes by midsummer. Poultry is quite an important item of production. Among the counties in which fruits, potatoes, and other vegetables form the cash staples, are Burlington, Bergen, Camden, and Monmouth. Dairy-products are prominent in Hudson, and wheat and corn in Warren. For the past three years this State has averaged about 100,000 bushels of cranberries produced, which is more than a third of the crop of the United States. The area in this fruit is not far from five thousand acres, requiring a capital of more than a million and a half in land and its cultivation. New Jersey is a good market for beeves, and most of the horses and mules are purchased from abroad. Western flour and wheat, and some corn, are brought into most of the counties.

Pennsylvania comes nearer being self-supporting than any of the older States of large population, producing everything that a system of mixed farming in a temperate climate can yield, and depending mainly upon the manufacturing and mining populations of the State for its market. It does not ship largely any of its products, as New York does butter and cheese, but sends a small surplus of dairy and fruit products, wool and mutton and other surplus of the farm, to New York, and butter and fruit to Baltimore and Washington. Its purchases from other States are far less in variety and extent than those of New York or New Jersey, in comparison with population. Animals are brought into the State for fattening, and liberally for stock improvement. A correspondent for Mercer, who has imported Clydesdale horses from Glasgow, English coach-horses from Hull, and draught-horses from London, recently sold four for $12,181. Many Pennsylvanians are quite successful as stock-breeders, and find markets in different portions of the country. Lancaster, York, and Bucks send millions of pounds of tobacco beyond State lines. Susquehanna, with an area of 800 square miles, makes 3,000,000 pounds of butter and sells 90 per cent. of it. The model farm district, Lancaster, ships four-fifths of its products beyond the county, and brings little in. Among the counties which have a

surplus of wheat are Lancaster, (producing 2,000,000 bushels of wheat,) Bucks, Lehigh, York, Cumberland, Perry, Snyder, Fulton, Erie, Chester, Dauphin, Franklin, Adams, and Westmoreland. This is the great wheat-growing State of the East, producing nearly as much as California; in 1869, according to the census, 3,000,000 bushels more than that wheat-exporting State. Some of the counties have occasion to bring in considerable flour and grain. Susquehanna buys half its home consumption of flour, Tioga a larger proportion, and Butler, Warren, Wayne, Clearfield, Clinton, and McKean are also purchasers; and wheat is imported by Luzerne, Cameron, Lehigh, and Lawrence. Steers for feeding are brought into Erie, Columbia, and Lehigh. Three-fourths of the beeves of Elk are imported, and 50 per cent. of those of Clinton and Dauphin, and other counties buy largely. Some counties have a small surplus of horses and mules, and others a deficiency; but the stock of the State is mainly grown within her border, except some animals for fattening.

The surplus of Delaware is largely fruit and vegetables; Sussex, the southern county, though exclusively agricultural, imports half its flour supplies. Most of the animals in use are bred, though a few horses and mules are bought.

Tobacco is the surplus product of Maryland agriculture, nearly all going out of the State. The counties producing the bulk of the crop are Anne Arundel, Calvert, Charles, Prince George's, and Saint Mary's. These counties lie between the Potomac River and Chesapeake Bay. The eastern-shore counties, lying west and south of Delaware and east of the Chesapeake, ship largely of peaches and sweet-potatoes. It is the surest peach section of the country. The cash-bringing product of Montgomery is hay; of Washington, wheat; of Frederick, wheat and corn. Mixed farming prevails in all the counties of Western Maryland to the Alleghanies. Flour is extensively purchased in the tobacco-growing and fruit-producing counties. Frederick, Harford, Baltimore, Carroll, Cecil, and Washington are most extensively interested in stock-growing.

The principal surplus of Virginia is tobacco, which is grown more or less in nearly all the counties, but extensively for shipment only in counties east of the Blue Ridge and in the southern portion of the State. Most prominent among these are Pittsylvania, Halifax, Mecklenburgh, Charlotte, Nelson, Bedford, Albemarle, Amherst, Amelia, Brunswick, Campbell, Franklin, and Henry. It also furnishes a portion of the revenues of many other counties, among them Chesterfield, Floyd, Lunenburgh, King William, Buckingham, and Prince Edward. Wheat is shipped from Clarke, Augusta, Craig, Madison, Prince George, Richland, Botetourt, Loudoun, Pulaski, Frederick, Montgomery, Washington, Culpeper, Tazewell, though not in large quantities. The great wheat region is the Shenandoah Valley and the slopes of the Blue Ridge in Northern Virginia. Princess Anne and Norfolk are truck-patches for the northern market. Cotton is grown in Prince George, Sussex, Rappahannock, to a limited extent, and a few bales in several other southern counties. In Prince George, wheat formerly exceeded in value all other crops, but rust so prevails that it is now confined to the banks of the James River, and cotton, pea-nuts, and winter oats are cultivated in its place. Wheat is drawn from the valley to Richmond, where it is manufactured into a superior quality of flour, of which 250,000 barrels annually are shipped to Rio Janeiro. Cattle and sheep for the shambles are shipped from the section west of the Blue Ridge and from Northern Virginia to the markets of Washington and Baltimore. Horses

and mules are brought into eastern counties, and a few stock-growers are securing well-bred animals for stock improvement.

Coming to the cotton section, which includes the coast States from North Carolina to Texas, with Arkansas and Tennessee, the principal money-receipts are derived from upland or green-seed cotton. Formerly it was scarcely deemed reputable to grow and sell any other crop in the cotton-districts proper. In northern Central North Carolina, a few counties derive revenue principally from tobacco. Some of the western counties sell cereals and a variety of products of the farm and orchard. Corn is the main crop in Burke, Camden, Catawba, Lincoln, Clay, Caldwell, and Pasquotank. Some of the best corn-lands in the country are found in the coast counties of the northeast, in the vicinity of Albemarle and Pamlico Sounds. Hyde County, in her deepest soils, produces a growth of stalk that Illinois scarcely can equal. Ashe, Buncombe, Clay, and, to some extent, all the western counties have cattle to sell. Apples are, perhaps, as abundant a crop in Western North Carolina as in Western New York, and so abundant that there is absolutely no market at any price, except as cut and dried, and in the form of cider-brandy, from a lack of railroads or other facilities for transportation. South Carolina has little for sale except cotton. The rice-district comprises the coast counties, Georgetown, Colleton, Charleston, and Beaufort, producing in the order named and yielding annually, before 1860, more than 100,000,000 pounds; now scarcely one-third as much. The Georgia rice region includes the coast counties, Chatham, McIntosh, and Glynn, in which production has declined materially. Florida is a thinly-settled region, and has little to spare, mainly cotton, upland and sea-island, some tobacco in one county, oranges, bananas, and various fruits and vegetables in the east and south, though the trade in the latter product is mainly prospective. In the entire returns from Georgia the money-crop is cotton in all the counties, excepting rice only on the coast, corn in Forsyth and White, and vegetables in Lumpkin. In Hall, White, Johnson, Gwinnett, Telfair, Schley, and Forsyth farm-animals of some kind are sold, beef, pork, or mutton. Hall, White, Schley, and Forsyth have some horses and mules to sell. There are other counties in the northern part of the State that supply wholly or in part the home demand for farm-animals; Telfair, one of these, raises nine-tenths of the home requirement. Camden sells this season 20,000 bushels of rice and buys 1,000 bushels of corn, also sells 100 tons of hay. Alabama and Mississippi counties, almost without exception, find cotton their principal if not their only surplus. Only Jackson County, in Alabama, reports any farm-animals sent elsewhere, and Rankin, in Mississippi. Cotton and sugar are the only crops sold in Louisiana, except small amounts of farm-produce in the way of local exchanges. Texas, a State with a rapidly-increasing cotton-product, has other prominent interests. A large proportion of the well-settled counties make cotton the main crop, throughout the eastern and central counties, from the Gulf to the Red River. Sugar is grown to some extent in the southeast. Wheat is admirably adapted to the northern central counties, and is mentioned prominently as a shipping-crop in Fannin, Coryell, Kern, Lampasas, Gillespie, Collin, Williamson, Kendall, Medina, and Bosque. The western and southwestern counties ship mainly cattle and sheep, wool and hides. Some counties, ordinarily self-sustaining, will require supplies this year for immigrants. Arkansas is almost exclusively engaged in cotton-growing. A few counties in the northern part of the State are better suited to mixed farming. Brown ships wheat and corn, Madison wheat and pork, and Washington

fruits and breadstuffs and meat. Tennessee, the last of the cotton States, produces cotton largely in only a few western and southern counties. The elevated portions, comprising a large part of the State, are better suited to the farm-products of the temperate zone. Among the counties selling wheat are Grainger, Hancock, Greene, Meigs, Sullivan, Washington, Williamson, Dickson, Monroe, and Bradley. It was once the great corn State of the Union, and many counties have now a surplus. Horses and mules and other stock are sold by the eastern and central counties generally. Dried fruit is a minor product of considerable importance in a large portion of Tennessee.

This whole section, with the exception of the most of Tennessee, a portion of North Carolina, the mountain areas of Georgia and Alabama, the most of Florida, and the western part of Texas, *i. e.* the cotton-growing area, procures nearly all its flour, most of the stock of horses and mules, a smaller percentage of beef-cattle and sheep, a large amount of bacon and other hog-products, from Tennessee and the Ohio Valley, and even from beyond the Mississippi. Some counties purchase all flour and nearly all meats. Almost everywhere corn is a large product, next in importance to cotton, but it is rarely sufficient to meet the demand, as it furnishes the principal support for both man and beast. The State of North Carolina, suited to almost tropical growth and to all the products of high temperate latitudes, having the sea-coast on one side, and elevations of 6,000 feet on the other, with hundreds of miles between of varied surface, should purchase less bacon and fewer horses from the West. Even an inland county like Lenoir buys elsewhere a portion of its supplies of flour, pork, and hay. South Carolina is still less independent in respect to these supplies. Though most of the counties of Florida are measurably self-supporting, the cotton-counties all obtain provisions from abroad; in Santa Rosa "nearly all the products of agriculture consumed here are brought from the Western States." A part of the hay, pease, and potatoes are the only exceptions. A large number of the Georgia counties buy 50 to 100 per cent. of the consumption of flour, from 25 to 67 per cent. of their corn, and from 30 to 75 per cent. of bacon, and nearly the full supply of horses and mules. A small number come much nearer self-support. Alabama and Mississippi average still larger deficiencies than Georgia; and that portion of Louisiana on the Mississippi depends upon the Northwest for nearly all supplies, corn being a partial exception to the general deficiency. The counties where cotton is grown in the other cotton-States have considerable deficiencies to supply from abroad. That this disproportion in crop-areas is neither necessary nor profitable is shown by the fact, everywhere presented, that those who make cotton their surplus crop, and make their own bread and meat, accumulate more money, and possess lands with fertility better sustained, than those who purchase most of their supplies.

West Virginia has a small surplus of mixed products, wool, beeves, and mutton, poultry and eggs, fruits, &c. Kentucky sells mainly farm-animals, horses, and mules, and tobacco. Hemp, once prominent, is now little grown. Eastern Ohio sells large quantities of wool; the bluffs and adjacent uplands of the Ohio River furnish for shipment by water large quantities of apples, while the Lake shore and islands of Lake Erie supply grapes and wine for distant markets; Northern Ohio makes a specialty of the dairy, and has a large trade in wool; Southern Ohio fattens and ships cattle from the Scioto to the Indiana line, and raises some mules for shipment; and the main tobacco-counties are Montgomery, Monroe, Noble, Brown, Belmont, Clermont, Washington,

Warren, Preble, Darke, Morgan, and Guernsey, none of which had a product smaller than one million pounds in 1873, and the first-named had about eight millions. Stock-cattle are bought largely from the West, some fruit is brought from Michigan, and thorough-bred animals for stock-improvement are to some extent obtained from abroad. The surplus of Michigan is mainly wheat, wool, potatoes, and fruit of various kinds on the Michigan shore and in the southern counties. It has a variety of productions, and each county, as a rule, furnishes mainly its own supplies. Some counties send abroad 75 per cent. of their wheat-product. Indiana has a surplus of wheat and other cereals, raises and feeds cattle, sells some pork, wool, and mutton, horses and mules, and disposes of much corn in the form of whisky. One distillery in Marion uses 1,000 bushels daily. New Albany ships down the river thousands of barrels of potatoes and vast quantities of cabbage. Tobacco is also a source of revenue to Indiana. Improved stock is brought into the State.

Illinois, the great corn State, one-fifth of its area being a corn-field, feeds cattle, fattens swine, and raises horses and mules for the southern market, some wool, and a variety of agricultural productions. There is usually one industry especially prominent in each section. Among the wheat counties, Adams, Pike, Jersey, Monroe, and Randolph, lie on the Mississippi, and have a rich soil, much of it well adapted to large yields of corn; Greene borders on the Illinois; Montgomery and Macoupin adjoin the fertile corn-producing Sangamon; Clinton and Washington are three-fourths fertile prairie; and Stephenson, on the northern border, is the finest portion of the Rock River Valley. The great corn counties are still more scattered, Champaign and Vermillion being in the eastern central part of the State. McLean, Logan, Morgan, and Mason occupy central positions; Bureau, Henry, Knox, La Salle, and Warren are north and west of the Illinois River, only two of which border upon it. Tobacco is shipped from Williamson, Saline, Hamilton, Franklin, Wayne, Johnson, and, in small amounts, from several others. Corn is shipped from the principal maize-producing counties, yet most of it is fed within the lines of the counties producing it. Hay is a leading shipping-crop in Marion and Hancock; fruits and vegetables on the line of the Central Road in South Illinois; and all the cereals are produced as a surplus in most of those mainly devoted to corn and wheat. Texas and western stock for feeding and many thorough-bred animals are brought into the State. Many counties fail to produce their own flour; some furnish a small market for potatoes, and several for fruits. Farm-productions are shipped extensively, and few purchased from abroad. The surplus crop of Wisconsin and Iowa is wheat. Hops are grown in both, mainly in the former, tobacco to some extent in Wisconsin, and cranberries in the marshes of the northwestern portion of the same State. Wheat is the main shipping-crop in every Minnesota county reported, except Isanti, where potatoes and hogs are named. Iowa has immense quantities of wheat and corn for export, stock and fat animals, from all settled portions of the State. Appanoose farmers have sold in one season timothy-seed to the value of $70,000, and think they can afford to buy flour and pay for it in the product of more profitable crops. Most of the Iowa counties ship wheat, most finding a local use for corn, but maize is the main export of Louisa, Fremont, Appanoose, Dallas, Jackson, Pottawattamie, and Story. Very little is procured abroad, except fruits, young stock, and improved breeds of farm-animals. Wheat is the principal surplus crop of Missouri counties, and oats, corn, tobacco, flax-

seed, cotton, and other crops increase the aggregate shipment, and hogs, and cattle for beef, with some horses and mules, constitute the surplus animal production. Some counties procure flour from abroad, and a few buy corn, potatoes, grass-seed, &c., though most of them are self-supporting. The principal corn-growing counties are, Saline, La Fayette, Jackson, Johnson, Holt, Henry, Cooper, Clinton, Clay, Cass, Carroll, Buchanan, Boone, Atchison, Nodaway, Polk, and Ray. Saint Charles, Saint Louis, Franklin, Saline, Cooper, Howard, La Fayette, and Lincoln produce largely of wheat. The largest tobacco-growers are Chariton, Franklin, Howard, Lincoln, Pike, Callaway, and Randolph.

Kansas is a self-supporting State, with a large surplus, except in recently-settled districts in very exceptional seasons of drought and grasshoppers. Even with a third of a crop of corn the past season, there are more than thirty bushels of corn to each inhabitant, and of wheat not less than eighteen bushels, allowing more than half the crop as a surplus. Labette yields half a million bushels of wheat, and Cherokee, Doniphan, Brown, Wilson, Saline, Montgomery, Johnson, Dickinson, and Crawford have from 200,000 to 400,000 bushels each of winter-wheat alone. The spring-wheat is about one-third of the crop, produced largely in Brown, Butler, Clay, Cloud, Dickinson, Jewell, Marshall, Nemaha, Republic, and Washington; none of which produce less than 100,000 bushels. Johnson, Leavenworth, and Miami contributed even last season more than a million bushels each of corn to the supply of the State. A surplus of farm-animals, wool, and various small products is also made, though the immigration of each year absorbs much of this, as is especially the case with all the productions of Nebraska. California ships mainly wheat, wool, wine, and fruits.

THE PROGRESS OF ASSOCIATION.

The answers to questions relative to the advantages to be derived from co-operation of farmers in selling, buying, or for mutual advantage otherwise, are various in tone and tenor, indicating a general desire to associate for mutual protection and advantage, but a great diversity in the degree of effort made in that direction and in the measure of success attained. These efforts are made by the Patrons of Husbandry, by agricultural societies, and local clubs, have been most general northwest, frequent in the South, and less so in the Middle and Eastern States. The purchase of commercial fertilizers by the quantity has saved much to southern planters, and much more would have been saved if ready money had been more generally in possession. In Culpeper, Virginia, an enterprising farmer saved to his neighbors $800 on 100 tons commercial fertilizers, $150 on 100 tons of plaster, and $150 on 150 bushels of clover-seed. In Wake County $2,000 was saved in the purchase of a quantity of a certain fertilizer made from the formula of one of the club, costing $30 per ton. The Piedmont Milk and Produce Association has saved a respectable sum in the marketing of their produce. In portions of the cotton States there has been quite a saving in the purchase of supplies; for instance, in Claiborne, Mississippi, flour was obtained in Saint Louis for $8 which had brought $14, and meal cost $4.25 per barrel instead of $7.50, and corn 85 cents instead of $1.50. The county of Lauderdale, Mississippi, claims a saving of $50,000 by co-operation. Other counties in the South and West report $40,000 or less; and the larger number refer to an indefinite, though considerable saving. There

are others that report no saving whatever or attempt at co-operation. In some cases it is asserted that losses have occurred from attempts of farmers to do business in the sale of their surplus and purchase of their supplies. Many business enterprises have been undertaken by granges and other associations, sometimes with positive advantage, and occasionally at a loss. In some cases the capital employed has been wasted, and additional assessments have been required. Probably the greatest advantage derived from these attempts to avoid the services of middlemen as much as possible has been the habit formed of purchasing for cash and avoiding debt. Among the many examples given of these enterprises, some in California are most prominent. The farmers of San Joaquin, connected with the Patrons of Husbandry, have an incorporated company; have their own warehouses to store their grain; and an agricultural warehouse where they sell all kinds of agricultural implements. By this means they have reduced the price of implements from 10 to 15 per cent. They have also reduced the price of storage on grain about 30 per cent. They have a Grangers' Bank in San Francisco that will advance money on warehouse-receipts for grain at a low rate of interest, thereby enabling the farmer to hold his grain for a remunerative price. There is also another advantage in storing grain in the grange-warehouse. It is this: the farmer receives the same number of sacks he delivered to be stored. Formerly he only received the same number of pounds that he delivered, and as the wheat is generally stored immediately after harvest, when it is very dry, the gain (if left in the warehouse any length of time) is very considerable. Sometimes the gain in weight between Stockton and San Francisco is equivalent to the cost of transportation between those points. By co-operation these farmers claim to have saved the past year in purchasing sacks for grain, agricultural implements, advantage in storing, procuring supplies, &c., not less than $50,000.

THE TOBACCO-CROP OF LAST YEAR.

The crop of 1874 was known to be exceptionally small and poor, from seeding to curing, and in nearly all of the tobacco-districts the destruction of seed-beds by insects, and the drought which dried out the plants before setting or burned them afterward, caused the reduction of the reported area in July more than half. One county in Kentucky, Adair, which grew 2,500 acres in 1873, had scarcely 25 acres planted on the 25th of last June. Low prices also discouraged planting in some sections. The average condition of the crop in Kentucky was 42 per cent. in July, 31 in August, 31 in September, 44 in October, and the indicated product in November was 40 per cent. In Virginia the monthly reports of condition were respectively, 79, 72, 55, and 65, and the product in November averaged 58 per cent. In November our summary said, "The reduced yield of tobacco was sufficiently foreshadowed in our previous monthly reports; all the large tobacco States show results indicating a disastrous year to the tobacco interest;" and a special report, from a careful census of the principal counties, was promised, which is herein presented. It will include the quantity grown, the acreage, the price and total value, the quality, kinds, and uses, mode of culture and curing, and other information.

There are 211 counties in the United States producing more than 100,000 pounds each: and all others combined contributed but 12,000,000 pounds, or little more than 5 per cent. of the crop. Of these 211, there

are 154 representing in the census 71 per cent. of the total production that appear in our present exhibit. These counties made a total of 186,276,726 pounds in 1869, and now return 99,805,602 pounds. In the census year 49 counties in Kentucky, which now report 19,306,835, produced 84,593,456 pounds. In 26 counties of Virginia, the decline is from 25,000,000 to 19,000,000, while the same counties last year yielded 33,000,000. In Ohio 10 counties give little more than half the census record, which was very incomplete. The estimate for Montgomery County is 2,500,000 pounds, less than a third of its usual product. Seven counties in Maryland that produced four-fifths of the crop of 1869, yield three-fourths as much as in that year, and about six-tenths as much as last year. In Tennessee the business has been nearly abandoned, 9 counties declining in production from ten millions in 1873 to one and a half in 1874. The decline has been small in most of the Connecticut Valley counties; in Hartford County the estimate was six millons in 1873, and six and a half in 1874. The reduction is large in Onondaga, New York, and Lancaster, Pennsylvania. The summary, by States, of the present returns is as follows:

States.	Number of counties reporting.	Pounds, census of 1870.	Pounds, estimated for 1874.	Number of acres, 1874.	Price per pound, 1874.	Value, 1874.
					Cents.	
New Hampshire	1	151,189	173,300	130	20	$34,660
Massachusetts	1	1,095,423	616,000	385	28	172,480
Connecticut	4	7,513,739	8,350,000	6,475	32.3	2,696,500
New York	2	1,408,143	789,670	1,215	13.1	104,054
Pennsylvania	3	3,371,764	9,877,400	8,427	15	1,489,410
Maryland	7	12,536,259	9,568,958	15,553	9.2	886,943
Virginia	26	25,131,788	19,474,980	35,180	12.1	2,224,506
North Carolina	7	6,859,716	4,260,375	12,737	16.3	696,875
Florida	1	118,799	200,000	300	22	44,000
Tennessee	9	10,666,858	1,450,000	2,402	9.7	140,775
West Virginia	5	976,694	488,308	600	14.1	69,313
Kentucky	49	84,593,456	19,306,835	30,025	12.4	2,383,948
Ohio	10	14,662,840	7,680,333	10,638	8.3	404,781
Indiana	3	3,603,043	3,795,000	8,225	9.4	357,150
Illinois	8	3,285,644	1,782,500	1,382	10.9	195,900
Wisconsin	2	875,076	775,000	760	7.5	58,125
Missouri	16	9,426,295	11,216,943	13,843	11.1	1,241,971
Total	154	186,276,726	99,805,602	148,277	.....	13,201,391

The details of the above statement, by counties, are as follows:

Counties.	Pounds, census of 1870.	Pounds, estimated for 1874.	Number of acres, 1874.	Price per pound, 1874.	Value, 1874.
				Cents.	
NEW HAMPSHIRE.					
Cheshire	151,189	173,300	130	20	$34,660
MASSACHUSETTS.					
Hampden	1,095,423	616,000	385	28	172,480
CONNECTICUT.					
Hartford	5,830,209	6,500,000	5,000	35	2,275,000
Litchfield	1,048,569	1,200,000	1,000	20	240,000
New Haven	103,562	150,000	125	21	31,500
Tolland	531,399	500,000	350	30	150,000
Total	7,513,739	8,350,000	6,475	32.3	2,696,500

Counties.	Pounds, census of 1870.	Pounds, estimated for 1874.	Number of acres, 1874.	Price per pound, 1874.	Value, 1874.
				Cents.	
NEW YORK.					
Onondaga	1,257,603	650,000	800	13	$84,500
Steuben	150,540	139,670	415	12.2	19,554
Total	1,408,143	789,670	1,215	13.1	104,054
PENNSYLVANIA.					
Bucks	151,372	475,000	475	19	90,250
Lancaster	2,692,584	9,122,400	7,602	15	1,368,360
York	527,808	280,000	350	11	30,800
Total	3,371,764	9,877,400	8,427	15	1,489,410
MARYLAND.					
Calvert	3,158,200	3,150,000	5,250	8.5	267,750
Charles	2,102,739	1,500,000	2,500	8.5	127,500
Frederick	274,369	297,500	.....	13.5	40,162
Howard	182,980	100,300	200	12	12,000
Montgomery	630,000	260,000	450	10	26,000
Prince George's	3,665,054	3,000,000	4,000	10	300,000
Saint Mary's	2,522,917	1,261,458	3,153	9	113,531
Total	12,536,259	9,568,958	15,553	9.2	886,943
VIRGINIA.					
Amelia	1,037,721	340,000	650	11	37,400
Appomattox	656,944	400,000	550	15	60,000
Botetourt	196,459	750,000	1,500	12	90,000
Buckingham	809,937	455,814	800	12	54,698
Campbell	1,761,901	1,451,040	2,073	9.5	137,849
Caroline	417,848	200,000	250	10	20,000
Chesterfield	194,510	100,000	400	11	11,000
Dinwiddie	844,504	330,000	660	14	46,200
Floyd	157,467	300,000	800	20	60,000
Fluvanna	894,023	800,000	1,000	12	96,000
Franklin	1,696,549	1,500,000	3,000	7	105,000
Hanover	439,434	109,858	.....	11	12,084
Henry	1,129,617	1,250,000	2,500	22.5	281,250
Louisa	930,226	400,000	500	10	40,000
Lunenburgh	963,673	641,000	1,600	10	64,100
Mecklenburgh	2,166,628	2,000,000	4,000	12	240,000
Montgomery	204,747	752,000	1,250	25	188,000
Nelson	1,199,182	800,000	1,000	12	96,000
Pittsylvania	4,282,511	4,200,000	10,000	9.5	399,000
Powhatan	541,430	120,000	130	14	16,800
Prince Edward	960,700	600,000	1,500	12.5	75,000
Rockbridge	186,469	150,000	300	7.5	11,250
Spottsylvania	132,502	75,000	150	16	12,000
Cumberland	956,855	425,268	567	.....	.....
Goochland	405,215	525,000	.....	13.5	70,875
Charlotte	1,964,736	800,000	.....	.....	.....
Total	25,131,788	19,474,980	35,180	12.1	2,224,506
NORTH CAROLINA.					
Alamance	155,570	450,000	1,200	25	112,500
Caswell	2,262,053	1,000,000	3,000	20	200,000
Person	1,227,150	750,000	1,702	20	225,000
Rockingham	1,441,971	1,500,000	5,000	20	30,000
Warren	751,045	30,000	500	11	3,300
Stokes	844,145	400,000	1,000	25	100,000
Guilford	177,782	130,375	335	20	26,075
Total	6,859,716	4,260,375	12,737	16.3	696,875
FLORIDA.					
Gadsden	118,709	200,000	300	22	44,000
TENNESSEE.					
Dickson	462,130	50,000	100	10	5,000
Dyer	412,440	25,000	45	14	3,500
Macon	950,768	50,000	100	10	5,000
Obion	645,937	40,000	50	15	7,500
Robertson	2,103,322	80,000	200	13	10,400
Smith	2,250,202	600,000	757	10	60,000
Sumner	909,568	175,000	300	6.5	11,375
Weakley	2,599,590	250,000	600	8	20,000
Wilson	332,901	180,000	250	10	18,000
Total	10,666,858	1,450,000	2,402	9.7	140,775

Counties.	Pounds, census of 1870.	Pounds, estimated for 1874.	Number of acres, 1874.	Price per pound, 1874.	Value, 1874.
				Cents.	
WEST VIRGINIA.					
Cabell	135,410	10,000	20	15	$1,500
Fayette	188,165	125,000	200	10	12,500
Kanawha	412,469	183,308	130	12.5	22,913
Mercer	117,429	130,000	170	20	26,000
Monroe	123,221	40,000	80	16	6,400
Total	976,694	488,308	600	14.1	69,313
KENTUCKY.					
Adair	1,231,665	150,000	250	7	10,500
Ballard	2,863,455	984,485	700	14	137,828
Boone	279,740	150,000	200	8	12,000
Bracken	4,188,039	600,000	1,350	17	102,000
Breckinridge	3,338,471	800,000	1,100	13	104,000
Barren	2,473,939	900,000	1,285	12	108,000
Butler	1,008,582	100,000	225	10	10,000
Callaway	1,924,502	100,000	150	10	10,000
Carroll	669,875	150,000	175	12	18,000
Christian	5,384,137	1,500,000	3,000	14	210,000
Clinton	117,238	125,000	250	10	12,500
Cumberland	1,304,366	100,000	125	10	10,000
Daviess	6,273,067	2,500,000	.....	12	300,000
Edmonson	414,840	50,000	100	10	5,000
Fleming	305,954	140,000	200	15	21,000
Gallatin	157,050	100,000	130	16	16,000
Grant	164,295	200,000	275	15	30,000
Grayson	859,760	275,000	550	9	24,750
Graves	4,474,195	1,220,000	.....	13.5	164,700
Green	1,375,091	211,250	245	10	21,250
Hardin	284,178	20,000	50	12	2,400
Harrison	281,704	166,500	383	12.7	21,145
Hart	2,315,212	250,000	425	10	25,000
Hickman	570,287	100,000	150	12.5	12,500
Hopkins	3,012,053	80,000	2,666	8	6,400
Kenton	360,983	250,000	500	16	40,000
La Rue	368,106	160,000	350	13.5	21,600
Livingston	1,086,578	100,000	125	11	11,000
Logan	2,707,571	485,000	970	11.5	55,775
Marion	132,293	9,600	20	12.5	1,200
Marshall	1,416,282	40,000	60	11	4,400
McLean	2,262,037	400,000	1,000	11	44,000
Meade	539,000	60,000	75	11	6,600
Metcalf	1,310,381	100,000	200	11	11,000
Monroe	674,696	100,000	140	9	9,000
Muhlenburgh	1,821,988	200,000	300	6	12,000
Ohio	3,392,633	225,000	450	12	27,000
Owen	2,890,670	800,000	1,300	17	136,000
Pendleton	1,651,593	800,000	1,600	15	120,000
Robertson	1,648,201	100,000	125	.....	.....
Shelby	240,435	100,000	125	12.5	12,500
Simpson	1,072,401	60,000	100	13	7,800
Taylor	1,209,830	150,000	300	7	10,500
Todd	2,620,193	500,000	1,000	15	75,000
Trigg	3,614,363	500,000	700	12	60,000
Trimble	658,465	200,000	200	12	24,000
Union	2,096,260	2,000,000	5,000	11	220,000
Warren	2,035,159	495,000	618	8	39,600
Webster	3,511,649	500,000	833	8	40,000
Total	84,593,456	19,306,835	30,025	12.4	2,383,948
OHIO.					
Adams	102,473	18,000	120	19	3,420
Athens	207,839	191,693	272	12.5	23,961
Belmont	1,480,478	2,360,140	2,411	.....	.....
Brown	2,687,743	445,500	495	.....	.....
Guernsey	474,178	150,000	250	8	12,000
Monroe	2,845,525	500,000	1,000	9	45,000
Montgomery	3,963,183	2,500,000	4,000	8	200,000
Morgan	486,125	275,000	550	8	22,000
Noble	2,304,557	1,200,000	1,500	8	96,000
Vinton	110,739	40,000	40	6	2,400
Total	14,662,840	7,680,333	10,638	8.3	404,781

Counties.	Pounds, census of 1870.	Pounds, estimated for 1874.	Number of acres, 1874.	Price per pound, 1874.	Value, 1874.
INDIANA.				*Cents.*	
Dubois	358,948	1,100,000	1,400	8.5	$93,500
Perry	224,125	195,000	325	7	13,650
Spencer	3,019,970	2,500,000	6,500	10	250,000
Total	3,603,043	3,795,000	8,225	9.4	357,150
ILLINOIS.					
Edwards	133,150	100,000	130	11	11,000
Franklin	387,382	200,000	230	12	24,000
Hamilton	471,860	400,000	.....	11	44,000
Johnson	307,013	150,000	187	9	13,500
Pulaski	157,000	32,500	65	12	3,900
Wayne	541,605	100,000	250	12.5	12,500
White	135,045	100,000	120	10	10,000
Williamson	1,152,589	700,000	400	11	77,000
Total	3,285,644	1,782,500	1,382	10.9	195,900
WISCONSIN.					
Dane	229,568	75,000	60	7.5	5,625
Rock	645,508	700,000	700	7.5	52,500
Total	875,076	775,000	760	7.5	58,125
MISSOURI.					
Boone	149,634	75,000	135	.....	.....
Callaway	938,228	1,238,200	1,250	12.5	154,775
Chariton	2,993,981	3,500,000	3,000	10.5	367,500
Franklin	783,270	401,270	213	12.5	50,159
Howard	788,132	1,000,000	2,000	9	90,000
La Fayette	113,735	35,000	50	9.5	3,325
Lincoln	691,727	360,000	400	15	54,000
Macon	355,767	350,000	3,500	10	35,000
Monroe	187,691	500,000	1,000	9	45,000
Osage	119,617	150,000	200	10	15,000
Pike	632,552	2,000,000	.....	14	280,000
Randolph	873,776	1,000,000	1,400	8.5	85,000
Ray	190,335	280,000	400	9	25,200
Saint Charles	146,754	73,473	.....	9	6,612
Stoddard	118,534	54,000	45	10	5,400
Webster	143,162	200,000	250	12.5	25,000
Total	9,436,295	11,216,943	13,843	11.1	1,241,971

Twenty-five years ago Virginia stood at the head of tobacco-growing States. It retained its position ten years later, when the crop had doubled. Since 1860 it has given place to Kentucky, which is credited by the last census with 105,000,000 pounds, and doubtless actually produced 140,000,000 in the census year. Three Atlantic States, with four Western, at one time monopolized the production—how fully may be seen by the following table:

States.	1850.	1860.	1870.	1874.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Virginia	56,803,227	123,967,757	37,086,364	35,000,000
Kentucky	55,501,196	108,102,433	105,305,889	34,500,000
Tennessee	20,148,932	38,931,277	21,465,452	5,780,000
Maryland	21,407,497	38,410,965	15,785,339	16,500,000
North Carolina	11,984,786	32,853,250	11,150,087	8,500,000
Ohio	10,454,449	25,528,972	18,741,973	13,000,000
Missouri	17,113,784	25,086,196	12,320,483	13,860,000
Total	193,413,871	392,880,850	221,855,567	127,140,000
Other States	6,338,784	41,328,611	40,879,774	51,215,000
Grand total	199,752,655	434,209,461	262,735,341	178,355,000

Combining the county returns in the foregoing tables with various data from other tobacco-growing areas, and carefully estimating for the fragments of areas unreported, the following statement is presented as the estimated tobacco-production of 1874, the acreage on which it was grown, and the value of the crop in the hands of the producer:

States.	Pounds.	Acres.	Value.
New Hampshire	180,000	141	$36,000
Vermont	105,000	99	21,000
Massachusetts	4,920,000	3,393	1,377,600
Connecticut	9,030,000	7,224	2,889,600
New York	1,593,000	2,451	207,090
Pennsylvania	10,500,000	9,130	1,575,000
Maryland	16,500,000	27,049	1,567,500
Virginia	35,000,000	63,636	4,200,000
North Carolina	8,500,000	25,757	1,360,000
South Carolina	45,000	100	6,750
Georgia	291,000	502	37,830
Florida	216,000	327	47,520
Alabama	166,000	302	33,200
Mississippi	80,000	133	16,800
Texas	141,000	188	31,725
Arkansas	708,000	1,348	106,200
Tennessee	5,780,000	9,633	578,000
West Virginia	1,690,000	2,224	236,600
Kentucky	34,500,000	53,906	4,278,000
Ohio	13,000,000	18,055	1,170,000
Indiana	12,000,000	26,086	1,128,000
Illinois	7,000,000	8,974	735,000
Wisconsin	2,250,000	2,250	168,750
Missouri	13,860,000	18,237	1,524,600
Kansas	300,000	517	30,000
Total	178,355,000	281,662	$23,362,765

QUALITY.

Dry weather cured the crop of the northern portion of the Connecticut River in the field, and left it brittle. In the Hartford district there is loss of quality from drought. Part of the crop of Hampden, Mass., is of extra quality, especially where it was matured early and was warehoused in good order. In the New Haven district quality is fine, but color various; if this unevenness of color is lost in the sweating process it will be the best crop raised since 1871. In Tolland there was wet weather during the culture, and very dry weather during curing, which proved unfavorable to the best quality. Quality is not superior in Onondaga County, New York, in consequence of wet and cold weather; it is only medium in Steuben, dry weather affecting the leaves somewhat, many of which are injured by worm-punctures. In Pennsylvania the crop is inferior to that of 1873; in Lancaster it grew slowly, and encountered heavy rains when nearly ripe; in Bucks dry weather prevented the maturing of fine leaves, and caused them to dry too rapidly, and contract when housed.

The quality of the Maryland crop is nearly everywhere reported lower than in recent years. In Prince George's it is deemed better than last year, on account of being handled at the proper time, and from favorable curing-weather. It was late in growth and of a dark color in Saint Mary's. Only 60 per cent. is of average quality in Montgomery, from injury by the fly, and the drought of June and July. In Howard there is much immature frosted tobacco. It is thick-leaved, small, and dark-colored in Frederick. Lateness of growth and early frosts were injurious in almost every portion of the State. Similar causes affected a portion of the Virginia crop; that planted before the 1st of June generally was very good; that planted later suffered from drought, and was cut

when immature to avoid frost. While a majority of the counties return inferior quality, many others with a smaller area to cure or a more southern location claim a superior crop, as Floyd, Fluvanna, Henry, Patrick, Pawhatan, and others. Counties in North Carolina, with few exceptions, have crops of more than average quality. The fly worked among the young plants to some extent, and drought, a severe storm in September, and frost wrought further injury.

Qualityis rather below average in Tennessee, owing to a wet spring, drought, and early cutting to escape frost. In Robertson about half is good; a fourth was cut before it was ripe, and the remaining fourth was frosted in the field. In Mercer, West Virginia, superiority in quality was obtained by favorable weather for maturing and curing. The crop was good in Fayette, and fair in Kanawha, but very poor in Cabell, from early drought. The quality is generally inferior in Kentucky, from the destruction of young plants by the fly, injury from drought, causing imperfect growth and late maturing; so that much was either cut immature or frosted in the field. In some places the early-planted was good; in Clinton, one-fourth good, one-fourth medium, and one-half poor. Among the exceptions are Hardin and Meade, above average in color, but light in weight; Hickman, very good; Larue and Clinton, early planted, above average; Graves, good; Pendleton, good fiber, well colored; Owen, above average; Simpson, fine; Todd and Trigg, one-half excellent, the remainder frosted.

Counties in Ohio return comparatively poor quality. Montgomery had one of the poorest crops ever raised. A small insect destroyed a large portion of the plants in Vinton. Fifty per cent. deterioration is returned from Monroe. Late planting and subsequent drought were prominent causes of poor quality. In Washington the crop is claimed to be good. In Indiana and Illinois the quality is quite uniformly good; it was in some counties more carefully cultivated and handled than usual. Drought injured the Wisconsin crop. Most of the Missouri counties make favorable report of quality, many indicating an improvement over last year, and some admitting injury from drought.

VARIETIES AND USES.

Few, if any, plants are so modified by peculiarities of the soil on which it is grown, and by circumstances of fertilization and culture, as tobacco. Whether the crop is worth in market five cents or fifty per pound depends more upon these points than upon the variety grown. And yet there are many varieties, showing the most marked points of difference. Fashion, as to color and other points, contributes to widen the range of prices.

The Connecticut seed-leaf, used for wrappers for Havana fillers, and lower grades of fillers, or binders to cheap cigars known as seed-cigars, is cultivated almost exclusively in New England, *i. e.*, the Connecticut Valley, from Cheshire County, in New Hampshire, to the sea. The Housatonic Valley, in Connecticut, has recently made this crop somewhat prominent; and, by a superior system of warehouse classification, it realizes returns almost equal to those secured on the Connecticut. In the town of Westfield, in Hampden, Massachusetts, the Havana seed is grown, said to be a cross of the Connecticut with Havana; a plant of firm leaf, better flavor, and greater value for wrappers of fine cigars than the broad-leaved common variety. In the vicinity of Hartford are varieties bearing the names, Connecticut seed-leaf, broad seed-leaf, Belknap, Puritan, and Ohio broad-leaf.

The Connecticut seed-leaf is the kind grown in New York, almost exclusively in Onondaga, Chemung, and Steuben. The best quality is used for cigar-wrappers; and the coarser and imperfect stock is manufactured into smoking or chewing, and some of the refuse is ground into snuffs. A cross from Havana seed is mainly grown in Bucks County, Pennsylvania, much resembling imported Cuba tobacco.

The Maryland tobacco is of two principal varieties, the broad-leaf and the narrow-leaf. The former commands a higher price; the latter yields a larger quantity. Much of it is exported; a large order is usually filled for the French government. It sells at a moderate price, has no peculiar value for wrappers, and is used for cigar-fillings, ordinary snuffs, twist and plug chewing, and for manufactured smoking brands. In Montgomery County a kind known as Bay tobacco is grown. The Big Pryor variety is deemed the best in Botetourt County, Virginia; the Blue Pryor is popular in Amelia. The White-stem, a dark-colored shipping tobacco, is quite extensively grown in strong, heavy lands, finding a good market in England. The Cumberland correspondent claims that as the banner county for shipping and stemming tobacco. A fine grade of tobacco is made from Orinoco seed. The Frederick, a vigorous grower, is cured to a dark "nutmeg color," and is principally shipped to Europe. The crop of Montgomery has a large leaf which cures bright, and is useful for wrappers, with careful assorting. The red lands generally produce too coarse and strong a quality for cigars or fine chewing brands, but suitable for shipping. Several kinds are grown in Henry, but growers aim to produce a bright, yellow leaf, suitable for plug chewing-tobacco. The new lands, and old fields on which fertilizers are used, yield a light yellow, manufacturing grade.

The soil of several counties in North Carolina, near the Virginia line, is peculiarly adapted to the production of light-colored and high-priced wrappers. Person, Caswell, and Granville claim to "surpass any other portion of the United States in adaptation to the growth of the first and most remunerative grades of tobacco." The average price of the last crop in Person County is placed at 30 cents, of the Gooch, White-stem, Yellow Pryor, Big Orinoco, and Little Orinoco varieties. The first is distinguished by fine texture and small fiber, and is successfully grown on light, sandy soil, almost valueless for grain or grass, and brings from 40 cents to $2 per pound for wrappers. The White-stem is second in quality, Yellow Pryor third, and Big Orinoco fourth. The respective area of each in cultivation widens in the order named, except that the Pryor's liability to injury from frost is driving it from the field. All these are usually coal-cured and used for wrappers. The Little Orinoco is coarse-grained, grown on rich soils for weight rather than quality, not adapted to yellowing, and air-cured or dried with wood fires, is used for fillers, and sells at 15 to 25 cents. It is reddish brown in color; sometimes nearly black. In Caswell the broad-leaf Orinoco is most cultivated, though some prefer the Yellow Pryor variety, less in weight and richness, but of finer texture. Light lemon-color commands the highest price. The White stem and Orinoco are mainly cultivated in Stokes.

Gadsden County, Florida, has produced for forty years a variety grown from seed obtained in Cuba, having a small, narrow leaf, and possessing to a remarkable degree the peculiar aroma and delicate fragrance so highly prized in the Havana cigar. Since the advent of German buyers an article was introduced which produces the "Florida wrapper," and is now the main growth. Its leaves are sometimes three feet in length and twenty inches in breadth, of a fine silky texture, admirably

adapted to use as wrappers, the coarser leaves being used very acceptably as fillers. Another variety, medium in size, introduced since the war, highly aromatic, even somewhat pungent, makes a strong cigar.

There are different varieties in Tennessee, as the White Stem, Big Stem, Big and Little Frederick, Blue and Yellow Pryor, Orinoco, yet when grown several years they appear to assimilate in quality and appearance. Much of it is cured a red or mahogany color, and finds a large sale in European markets.

Kentucky, the tobacco-field of America, has many varieties. That grown in Christian, Trigg, Todd, Logan, and in Stewart, Montgomery, and Robinson, in Tennessee—known to the trade as the Clarksville district, though Hopkinsville is now a rival point for the traffic—has a heavy body and is well adapted to the export trade; it is largely used in Germany, Austria, and the north of Europe, though a portion is sent to Mexico and the coast of Africa. It has no competition in the West, and is only approximated on the manured lands of Virginia. The soil on which it is grown is limestone, with a deep-red clay subsoil. Its peculiar mode of curing contributes largely to its recognized characteristics. It is cured in close barns in the course of two or three days' heavy firing, which gives greater body than the air-cure. The White Burley is a favorite in many counties, among which are Bracken, Fleming, Pendleton, Grant, Shelby, Trimble, Kenton, and others. This is cured of a bright-yellow color, and is used for cutting into "fine-cut," and sometimes for wrappers. Old land, well manured and cultivated, will yield a heavy shipping tobacco from almost any variety; and a red or black oak soil will make a bright wrapper from the same varieties. Fleming County is working exclusively for the cutting trade. Good chewing grades are made from the Yellow Pryor and the Long Green in Hardin; and the Pryor is also the favorite variety in Hart, in Muhlenburgh, and in Adair. The Little Frederick is most grown in Clinton. The one-sucker variety, producing only one sucker to the leaf, is favorably regarded in Adair, Clinton, Hart, and other counties. Cumberland produced good shipping leaf; Hickman grows shipping grades used largely in plug-tobacco; that of Hopkins is manufacturing and shipping, and about one-fourth of the crop is made into strips; and shipping leaf is prominent in Logan, sought by English and French buyers, for wrapping and manufacturing purposes. There are many other names of assumed varieties, but the above are among the best known.

The leading variety in Montgomery, Ohio, the Baltimore Cuba, is from seed sent out by this Department. It has a long and broad leaf, and when properly cured makes good wrappers. "This seed has been worth millions to the county," says our correspondent. The white tobacco, grown in Adams County, is used for wrappers and fine-cut. The Monroe crop is similar to the Maryland tobacco, and goes to Europe for smoking-tobacco. It is used to some extent in the manufacture of cigars. The Connecticut seed-leaf and the Kentucky are the best varieties in Vinton. In Spencer, Indiana, the Pryor is grown for fillers and black wrappers, and the White Stem and Twist-bud are shipping leaf sorts. The White Burley and Yellow Pryor are favorite varieties in Edmunds, Illinois; in Johnson, three kinds are grown, the Pryor, the Big Shoe-string, and Big White Stem, the two latter yielding most; that grown in Southern Illinois is mainly used for fillers and wrappers and in the cutting-trade. The Crown-leaf, in Rock County, Wisconsin, is exported, though choice lots are taken at home for wrappers and binders for cigars. The Yellow Pryor appears to be largely grown in Missouri for the shipping-trade. The Little Frederick, Twist-bud, Long Green, and Fine Small are other

desirable varieties, the latter liked by many experienced and careful growers. That grown in Boone County for exportation ranks high as a chewing-tobacco.

ROTATION.

A sort of irregular rotation is to some extent practiced in the Connecticut Valley. In the vicinity of Hartford it is customary to take off from one to three crops of tobacco, then a hay or grain crop, followed by grass for several years. Lower down the valley rotation is observed to some extent, and the general testimony accords therefor better returns. Our Hampden (Massachusetts) authority deems the quality better if repeated crops are taken.

In the Onondaga (New York) district a clover-sod, with a good spring growth, and fifty to sixty loads of manure per acre, all well turned under and reduced to a fine tilth, is the favorite soil for tobacco-planting. Wheat is the next crop. Sometimes crops of tobacco are repeated, with eighty to one hundred loads of manure per acre, but more than two or three crops are indicative of bad farming. In Steuben the preferred order is clover, corn, tobacco. In Lancaster, which county produces a large proportion of the crop of Pennsylvania, tobacco is preceded by corn and followed by wheat. The rotation in York is similar. Quite uniform Maryland practice is to follow tobacco with wheat. In Calvert County it is grown every third year, the crops being clover, tobacco, wheat. It is preferred in Charles to have it follow corn rather than "a fresh fallow." New land in Frederick, after a crop of tobacco, is sown to wheat, then grass. Three crops are sometimes taken from new land in Montgomery, but further continuous cropping results in larger plants of inferior quality. The regular three-year rotation is generally practiced in Prince George's, though some planters prefer the four or five year plans. Where new land is taken for tobacco in Virginia, two or three consecutive crops are usually taken, followed by wheat, afterward clover or grass. In old ground the common rotation is clover, tobacco, wheat; in some counties wheat precedes tobacco; where only two fields are used, which get all the manure from stables and cattle-pens, the crop is only alternated with wheat. Corn comes in between tobacco and wheat in Patrick. In some counties a year or two of fallow comes after wheat; in other counties a similar rest follows two or three consecutive crops of tobacco on new land. New land is preferred in North Carolina, and soils peculiarly desirable for particular kinds and qualities of tobacco are selected with great care. No attempt at rotation is reported from Florida. A systematic course of cropping is by no means the rule in Tennessee. Wheat is most frequently grown after tobacco, but corn or other crops sometimes occur in succession. On new land wheat is sometimes grown between two crops of tobacco, followed by a similar period in corn, wheat, and clover. Old ground is manured for the tobacco-crop. Fertilizing for tobacco is virtually unknown in West Virginia. Wheat, as elsewhere, is usually adopted for the succession, followed by clover, on the best-managed lands; but the more careless farmers follow with promiscuous cropping until the land is exhausted and turned out to grow mullein, pennyroyal, and rag-weed. Some sort of rotation is deemed a necessity in Kentucky, though some counties do not practice it; it is held that to grow the crop "on the same ground two or three years in succession would everlastingly ruin it;" also that it cannot be successfully grown on timothy-sod; but that it may be cultivated in successive crops by sowing rye and turning under in spring when a foot high. The preferred course appears to be tobacco, wheat, clover; if longer, two years

in clover. In Ohio several crops are in many cases grown in succession; sometimes two of tobacco, two of corn, and one of wheat, and then grass or tobacco again; in other places tobacco, wheat, clover, as in other tobacco regions. Farther west, where new lands are abundant, tobacco-growing is either confined to such lands, or alternated with wheat, with little thought of any regular course of rotation.

CULTURE AND CURING.

A comparison of the local modes of culture and curing reveals great differences in the *modus operandi* of tobacco-husbandry.

The cultivation in Cheshire County, New Hampshire, substantially the northern limit of Connecticut Valley tobacco-growing, is essentially the same as in Massachusetts and Connecticut. The soil is a warm, sandy loam, manured with ten or twelve cords of stable-manure and two to five hundred pounds of guano per acre, harrowed in. The surface is ridged up to bring the manure around the plant. Sometimes the ground is lightly marked with the plow, and guano or superphosphate of lime placed in the hill. When the plants are set they are mulched with straw or hay to prevent their withering. In Hampden, Massachusett, ten cords of good manure, horse-manure preferred, are applied. At the time of transplanting, which occurs from the 5th to the 25th of June, the land is plowed, and then a light furrow is cut, sowed with 300 pounds of guano or superphosphate, and covered with ridges, leaving the rows somewhat elevated. The Havana plants are set 18 inches by 3 feet; the seed-leaf 2 feet by 3. The yield of the former does not equal that of the common sort. The seed is usually sown in April in Connecticut, in a carefully-prepared seed-bed liberally manured with a rich compost or concentrated fertilizer. Horse-manure for the field-culture is obtained as far as possible, and supplemented with any available well-decomposed farm-yard manures, and also with Peruvian or fish guano, superphosphates, wood-ashes, bone-dust, tobacco-stems, and other fertilizers. The ground is plowed and harrowed sufficiently to pulverize and mix the fertilizers. The plants are set in Hartford County from July 1 to July 10, in rows 3½ feet apart, and from 18 to 25 inches in the row. The best cultivation is given; the seed-blossoms and all suckers are broken off; the plants are cut in August or September and left on the ground to wilt; then bundles of five to seven plants are strung on a lath, four feet long, and hung in the curing-house in tiers.

The district known as the Housatonic Valley comprises all of Litchfield County, five towns in Fairfield, two or three in Berkshire, and one in New Haven. Low prices have reduced the acreage to a lower figure than for eight years past, and the product is estimated at 3,500 cases, of which Litchfield produced 3,000 on about 1,000 acres. This district has had considerable experience with special fertilizers, and the conclusion is reached that they aid the growth of the plant while injuring its quality. At the present time most of the crop is grown with barn-yard manure, yielding a product of better color and texture, and one that comes out of the sweat better than that made with such special fertilizers. In New Haven the main resource for fertilizers beyond the common use of farm-yard manure, is a double-refined poudrette. In Tolland the liberal use of horse-manure, say eight to ten cords with 350 pounds of guano per acre, is deemed sufficient to keep up soil-fertility without rotation.

The main reliance in Onondaga, New York, is upon clover-sod and farm-yard manure, though various kinds of commercial fertilizers have

been used. Our correspondent says, "three acres of tobacco will require the manure accumulated from 100 to 200 acres." In Bucks County, Pennsylvania, the tobacco section is Falls Township, along the Delaware River, where the surface is nearly level, and the soil a rich, dark, sandy loam. During the winter 35 loads of manure per acre, brought in boats from Philadelphia at $1.25 per load, are spread upon the fields, and plowed under at a depth of 4 to 6 inches as soon as frost is out, and left till about May 20, when the soil is well pulverized and worked into hills 3 feet apart each way. A compost of well-rotted manure is applied in the hill. Fertilizers are believed to injure the burning qualities of the leaf, and their use has been discontinued. The culture is similar to that of cabbage, until the leaves are 6 inches in width, after which the fields are gone through two or three times per week in search of worms, which do not increase in abundance from year to year. The crop should be cut in twelve weeks from planting. In Lancaster, the largest tobacco-county in Pennsylvania, plants are set 20 inches apart in the rows, which are three and a half feet apart. The culture is about the same as for corn; the soil is kept well pulverized and free from weeds. Farm-yard manure is the main fertilizer, which is so extensively used that other crops suffer from lack of it.

In Maryland, seed is germinated from January 1 to March 15, in a well-prepared bed, enriched with barn-yard manure and Peruvian guano. As the plants attain the size of a man's hand they are transplanted when the earth is moist from rain. The distance apart varies somewhat, 2½ feet each way being the usual distance in several counties; in some cases 3 by 2 feet; in Prince George's 3 by 3 feet. In Calvert the land is well fertilized with farm-yard manure, guano, and superphosphate. When the plants begin to grow, the crust around them, with the starting grass, is scooped away with the hoe; this process is called weeding. Subsequent cultivation consists in stirring the soil every eight or ten days with a one-horse cultivator, as long as it can be done without injury to the leaves. When the blossoms appear the top is broken off, and the plant is allowed to stand until mature, when it is cut and hung on poles in the barn to cure. Suckers are broken off and worms killed during the growth. It is cut between August 20 and October 20, the first cut being the best. In Prince George's, growers prefer to plow both in fall and spring. They want very rich beds to start the plants, but do not care for heavy fertilizing of fields. They use guano, Turner's Excelsior, and the Old Dominion fertilizer. In Saint Mary's 20 to 30 loads of manure with 300 pounds of superphosphate per acre are spread in drills.

The housing and curing is thus reported in Calvert: When the leaves are sufficiently mature, and soft from moist weather, they are stripped from the stalk and tied up in small bundles, care being taken to keep the several qualities separate. When in proper condition these bundles are packed in hogsheads for market. Nearly all the crop is air-cured; a few planters use the curing apparatus of Bibb & Co., and by proper care and attention produce a superior article. In Montgomery, when cut it is hauled to the house and hung on sticks 4½ feet long. On one end of these sticks is an iron spear, on the point of which the plants are pressed, while the other end is made fast in the house, and thus about ten plants are strung upon each for curing, the sticks being hung 10 to 12 inches apart upon poles. Fires are kindled beneath the tobacco, which is hung 10 feet above. The curing process requires great experience to secure the desirable color, and caution to prevent the burning of house and tobacco together. The fires are kept up till the tobacco is

thoroughly dry. It is stripped from the stalks in damp weather and assorted, usually making four grades, yellow, spangled or red, ground leaf, and tips.

The following extracts from Virginia returns give a variety of information on culture, fertilizers, and curing:

Amelia: Land is sometimes, but not often, checked, or laid off both ways. When not checked the beds are thrown up with two furrows of a double-turning plow, and usually about 250 pounds applied to the acre of some one of the commercial fertilizers in the market; everybody uses different, changes every year, and alternately praises and blames. All agree in this, that there is no money in the use of them, either in the first or any subsequent crop; all agree that the commercial fertilizer has been a curse to the land instead of any benefit. What little stable-manure is raised is spread on the land before marking off. The ridges being up, hands with flat hoes pass along, and at intervals of 2½ to 3 feet strike off the crown of the bed and press it with a short blow from the flat of the hoe. In May or June, so soon as a rain has fallen and a "season has come," the plants are set, one in each hill. They live easily, and if the plants are of tolerable size, and no insects attack them, a stand is secured without difficulty. So soon as the plants give signs of growth in their new places, a 3 or 5 tooth cultivator is lightly run twice between the rows, one tooth being guided as near to the line of plants as possible without covering or disturbing them. Hoes follow, gently breaking the crust around the plant. This is a weeding operation, and if omitted serious consequences sometimes follow. Fields under a nice rain and warm sun become as a carpet in one week, with a grass here called "crab-grass." It incloses the plant and cannot be removed without imminent risk of death to it. This is the critical period, and if passed in safety the planter regards his crop safe. After this, until the 25th of August, the ground is kept stirred with shovel-plows, and kept level, or nearly so. The plants being now up, "primed" and "topped," single-turn plows are put in with four furrows to the row, the soil thrown up as high around each plant as the plow will heave it. By some this is not deemed sufficient, and they cause hoes to pass over the field, drawing the soil still higher up around the stalks of the plant. This sometimes proves of great benefit. The winds of the equinox, accompanied with soaking rains, are prevented from throwing the plants down into the mud. After this last hilling no further cultivation is required. The last of August and the whole of September is spent in quest of worms. *Appomattox:* Cultivated chiefly on newly-opened land without fertilizers, and upon lots with farm-yard manure. *Botetourt:* For old land, deep plowing, hilled with a two-horse plow. Our best farmers say it pays well to use a fertilizer, dropping a small quantity in the hill. *Caroline:* The beds for seed require the same preparation as for cabbage-beds; sow as soon after the 1st of January as the ground is in order; transplant soon as the plants have sufficient roots to sustain them; say the last of May or first of June. When the crop is planted out early, so as to ripen before the frost, and is kept clear of grass and worms, we never fail to make a fair crop. Various fertilizers are used; the one generally preferred is a preparation for tobacco by the Old Dominion Fertilizing Company, Richmond. *Chesterfield:* Land well plowed, stable-manure spread, listed both ways, the hills 3 to 3½ feet apart each way, flattened with the hoe; in season for the plants as early as they are large enough; and "a bud in May is worth a plant in June;" unceasing vigilance required in August and September to prevent its ruin by worms. *Cumberland:* Our leading idea is, to make a *heavy, rich, long* plant, either very early for the stemmers, or later in the season for shipping. The soil and climate are remarkably suited to tobacco, and by heavy manuring and thorough cultivation, 2,000 pounds per acre may be raised. *Dinwiddie:* Plow the land early in winter; in April spread on it all the manure we can find, from stable, farm-yard, and pig-sty, and plow it under; cross-plow and harrow early in May; mark off hills 3½ feet apart and fertilize at the rate of 300 to 500 pounds per acre, by hand or drill; then bed up the land, four furrows together, mark across 3 feet apart and chop and smooth with the hoe midway between the checks. Plant as early as practicable after the 10th of May. When ready for topping the best farmers always prune off the small leaves at the bottom, and break out the bud, leaving 8 to 12 leaves, according to the strength of the land or the time of topping. If planted any time before the 12th of June the farmer can select his own time for cutting, but if later he must beware of frost, or cut his crop green. We use all kinds of fertilizers. Peruvian guano acts better than any other. Our barns are principally built of round logs, the spaces being pointed with clay-mud to make them close. These are considered the best for curing, as they retain the heat better. To make dark stripping, or fillers, we commence firing soon as the tobacco is housed and keep the fires up for three days. It is only rich, strong land that makes this class of tobacco. To make red wrappers or fillers we put the tobacco in the barn, allowing plenty of space, and using no fire except in very damp or rainy weather to prevent mold. This tobacco is grown on almost any variety of soil, the richer the better. To

cure bright wrappers, plant on light-gray soil in fair condition as to fertility. Let the tobacco ripen on the hill before cutting; if the weather permits, scaffold three days in the sunshine, then put in the house and start fires of *charcoal*, slow at first, and gradually increased to the desired temperature; keep the heat at this point until the leaf-stem and stalk are thoroughly dried. Wrappers cured by this process are known as "coal-cured wrappers," and sell for 40 to 120 cents per pound. *Fluvanna*: A great portion of so-called fine, or high-priced, tobacco is grown on light-gray granite land. This is of a light yellow or brown color and rarely grows to a large size. It is often planted on new ground or lands that have grown up in pine. We have also strong, heavy lands on the Rivanna and James rivers which produce a coarser and larger growth of tobacco adapted to what are called strippers, and wanted for the English market. Our most successful tobacco-growers use fertilizers at the rate of 300 or 400 pounds per acre, with or without farm-yard and stable-manure. *Henry:* Old ground not often planted in tobacco more than once; new ground twice. Stone flues are generally used in curing, but charcoal-curing is growing in favor. *Louisa:* The two principal things are, to get the plants out early in May, if possible by the 15th, and to keep the crop well worked. An early stand insures against frost. The most popular fertilizer is that known as "Gilham's;" but it is sold too high, $70 per ton. It is generally sown at the rate of 300 pounds to the acre, and with a small amount of stable-manure acts well. *Lunenburgh:* Land for raising the plants is prepared by thoroughly burning in the latter part of December or early in January; the seed sown soon after. In a favorable season the plants are large enough for transplanting about the first of May. For the crop new or fresh land is usually taken. To insure a good stand, the transplanting must be in wet weather. *Montgomery:* Seed-beds prepared in January and February by burning the ground thoroughly; the earth and ashes well mixed and pulverized; the seed brushed in; the ground tramped or packed, and covered with a thin layer of brush. A wet season is indispensable for setting the plants. When the tobacco attains a sufficient size and number of leaves, the lower leaves are stripped off to the height of about eight inches, and the top taken off, leaving eight to ten leaves growing on the stalk. No fertilizers are here used. *Nelson:* Soon as the plant is large enough it is topped from eight to ten leaves, after taking off three or four of the bottom leaves. Soon as topped it begins to throw out suckers or sprouts just above each leaf. Then comes "the tug of war" to keep the crop clear of suckers and horn-worms. This requires the entire crop to be gone over, and each plant carefully examined about once a week. Fertilizers—such as bone-phosphate, Eureka tobacco-fertilizer—are used to some extent; but stable-manure is universally preferred, as being cheaper and more reliable. The ripe plants are cut out from time to time as they ripen, and are either hung up in the sun for two or three days or carried, as some prefer, immediately to the house. After wilting for several days, and until yellow spots begin to show on the leaves, slow fires are made under the tobacco, and gradually increased until the leaf is entirely cured. *Powhatan:* Stable or cow-yard manure is generally spread on the land, and plowed under in the fall, and the land refallowed in the last of April or first of May. The most popular fertilizers are the Pacific soluble and Gilham's tobacco-fertilizer. *Pittsylvania:* Commercial fertilizers are used. It is supposed that barn-yard manure will not produce as fine quality of tobacco as some artificial fertilizers, though it is acknowledged that most of these are not beneficial to the land. *Prince Edward:* As the season advances the plants are pruned and topped lower, leaving a smaller number of leaves, in order to bring a uniform ripening, as far as practicable. The tobacco is cured by making fires of logs on the floor of the barn, extending across the floor, and four or five feet apart. Peruvian and soluble Pacific guano are most used. Soft gray land is selected for the plant-beds, and prepared for the seed by burning with wood cut for the purpose. *Spottsylvania:* Peruvian guano and other fertilizers are extensively used. Old land manured makes a thicker, heavier leaf than fresh or new land from the woods. New land will produce only three-fourths as much in quantity as old. Not half the tobacco-growers put out a single plant, the fly having destroyed all the plants; but a few made better crops than for years. When the tobacco-bed was made beside a running stream, and a ditch cut around the bed, making it on an island, the plants escaped the fly.

The coal-cured tobacco of North Carolina is cut when it begins to yellow in the hill. In the barn it is first heated gradually until the leaf is nearly cured, when the temperature is raised to 175°, and kept at that point until the cure is complete. Heavy fertilizing is avoided for the bright, charcoal-cured, high-priced grades, to obviate the danger of a dark color and bad bloom from too much sap. On this account it is grown usually on new land, in a light, gray soil, for two consecutive years after the removal of the forest, with a small quantity of fertilizers, if necessary, to give the plants sufficient size. In Warren, seed-beds are

made by burning a moist, rich bottom, dug thoroughly four to five feet deep; the seeds are raked in quite shallow, the bed trampled with the feet, and covered with brush. Well-decomposed stable-manure is freely applied as a top-dressing to the plants, to keep up a high temperature, to hasten growth, and prevent the depredations of the fly; and in some cases, tobacco-stalks, chopped fine, Peruvian guano, hen-manure, and hog-hair. While fertilizers of all sorts are used in field-culture, the main reliance of the best farmers is found in farm-manure and wood-ashes.

In Gadsden, Florida, "the heretofore prevalent opinion that freshly cleared land was essential to the production of a fine quality of tobacco is fast giving way as the result of experience, it being found that successive crops may be grown on the same land without any deterioration in quality, so long as the fertility of the soil is maintained at its original standard and it is kept from being fouled with grass and weeds. Usually upon lands appropriated to tobacco no fertilizers are used for the first and second crops; after that a compost of barn-yard manure and cotton-seed, applied in the hill, is found to give the best results. In cultivation, if a lighter article is desired, the plow may be dispensed with after breaking up the land, and the cultivating done with the hoe. If a thick, heavy leaf is desired, the plant is topped so as to leave twelve or fourteen leaves; if a lighter article, it may grow until it begins to throw out the seed-branches."

Fertilizers are little used in Tennessee; growers in certain counties have scarcely heard of their use. New land is the main reliance. In Smith, where the soil is very fertile, "the practice of the tobacco-raiser has been to begin at the bottom of the hill, clear off a few acres, put them in tobacco from year to year till they become exhausted, and then go up the hill a few acres higher; thus wearing out, as it is called, and too truly, one field after another, until the tobacco-growing part of the county, which is a little more than half its area, is greatly exhausted."

In West Virginia tobacco is grown almost exclusively on recently cleared land, the best crop being obtained the second year, without fertilizers, and a sure crop of wheat follows.

Kentucky, the great tobacco State, is thus reported on the points of culture and curing:

Adair: The best piece of ground the farmer has is set apart for tobacco. It has for a long time been the habit to clear up a piece of woodland and plant it in tobacco until it is too poor to produce that crop; but since most of the good timbered lands have been cleared out, the farmers use manure to produce the crop, generally placing a good spadeful in each hill. If the season is wet, manure increases the crop greatly; but if dry, it burns it, and is not of much use. *Ballard:* No fertilizers used. *Bracken:* We use no fertilizers except well-rotted stable or barn-yard manure, which does well on old land. But new ground is best for tobacco, except for the finer qualities, and to this end farmers are constantly clearing up new land and old thickets and waste-places for fresh soil. *Christian:* The best lands are selected, as tobacco will not grow to any profit on poor land. Manure from the farm, but no fertilizers used. *Clinton:* No fertilizers except stable-manure. *Cumberland:* A large amount of our tobacco is cured without firing. *Edmonson:* Generally new ground is used for tobacco and then planted in corn. *Fleming:* The crop from new land is always superior in quality, and farmers endeavor to clear up a sufficiency for it. *Grant:* No fertilizers used. *Grayson:* My neighbor's ground and mine were about equal in condition, planted about the same time, and the crops grew very much alike until topping, worming, and suckering commenced. Difference in management after that caused the following results: My six acres made 5,600 pounds; his twelve acres, 5,300 pounds. *Graves:* The best tobacco raised on new land. No commercial fertilizers used. *Hardin:* Grown on new ground, without any fertilizer. *Hart:* Generally raised on new ground, and no fertilizer used. Stable-manure is used on thin soil. Let it stand until thoroughly ripe; cut and handle very carefully; house immediately in close barns; place several charcoal fires in each room, and keep them up until the tobacco is perfectly yellow, or, as some term it, white—the

lighter the better. Then increase the fires, and continue them until the stem is perfectly cured and dry. This produces a fine wrapping-leaf, worth 20 cents to $1 per pound. Flues and other modes of curing have been much used, but all growers who have tried it now conclude that the method of charcoal-curing is preferable to all others. *Henry:* The very best lands available are selected; new land preferred; but frequently a series of crops are taken from a newly cleared field before it is too much exhausted to render further cropping in tobacco profitable. Then it is put in small grain and grasses and is soon renewed. No fertilizers are used. *Hickman:* No fertilizers are used, as the ground used for tobacco is mostly fresh land, and seldom planted in tobacco more than two years. *Hopkins:* No fertilizers used. *Larue:* No fertilizer on new ground; on old, stable-manure well rolled. Rarely grown on the same land more than twice. *Livingston:* Mostly grown on new land; when on old, it is enriched by barn-yard manure. *Logan:* Farmers use little or no commercial fertilizers. They select new ground, or the best old they have, and use as much manure in the hill as they can scrape up from the stable, barn-yard, &c. *Mason:* Generally cultivate new ground and use no manure; or if any, stable-manure. *Marshall:* No fertilizer, except barn-yard or stable-manure when raised on land which has been cultivated a few years. Generally raised on fresh land. *McLean:* When old land is used, barn-yard manure is put in the hill or sprcad; no other fertilizer used. *Meade:* Generally clear up fresh land, but some plant on old by using manure from the stable. *Ohio:* Fertilizers seldom or never used. Fresh ground is generally selected and cultivated in tobacco three years, and then some other crop is cultivated. *Owen:* Fine tobacco must be grown on fresh but thin land; usually an oak-growth is best adapted to it. Nothing is used in the curing except to let it hang under a shed where it is not exposed to sun or rain. No fertilizer used. After being cleared up the ground is usually put in tobacco two or three years, and then not again till after years of rest in grazing. *Pendleton:* Generally cultivated on new ground; no fertilizers used. *Robertson:* Use no fertilizers; either plant on new ground or sod-land. Four-fifths raised is on the former, which will stand two crops in succession. *Shelby:* Generally, though not exclusively, cultivated on new or fresh lands. White-oak lands are the best for a fine article. No fertilizer is used except stable-manure, and that seldom, as its product is a dark, coarse article, not very salable. The plants are not allowed to blossom before they are topped, as recommended by writers on tobacco-culture; it would be too exhausting to the plant; topped as soon as they have as many leaves as will mature before frost. If set out early, twelve to sixteen leaves are left; if late, a less number. If the season is not too wet, fire is seldom used in curing in the tobacco-house. *Simpson:* No fertilizers used except barn-yard manure and wood-ashes. *Todd:* Stable-manure is used on old lands. Follow clover with tobacco when we do not have fresh-cleared lands. *Trigg:* Usually set in ground newly cleared, but latterly farmers are rotating their crops; tobacco first, then wheat with clover and timothy; the third and fourth years the hay is cut and the land pastured, then planted in tobacco again. No fertilizer except stable-manure made on the farm is used. *Warren:* The best land is generally selected for the crop, and barn-yard manure only is used. *Webster:* Well-rotted stable-manure the only fertilizer used. *Boone:* No fertilizers used. *Gallatin:* Generally planted on new land or old soil, and no fertilizers used. Bad peculiarities mostly proceed from bad culture: First, neglecting too long to thoroughly work the plant after setting, causing it to run up in a spindling manner and the main stalk to harden and make no leaf. In such case the best plan is to cut the plant off at the ground, leaving one leaf and bud for a second plant, which, properly cared for, may yet make good tobacco. A second cause is too much wet weather after the plant starts to grow, causing it to "French," as we term it: the leaf thickens, grows very narrow, dagger-shaped, frequently not broader than a case-knife, and often as many as fifty leaves on a plant, all of them spread out on the ground. In this case the best plan is to pull the plant up, as it is worthless. *Carroll:* The White Burley takes its name of "white" from the peculiar whitish appearance of the plants just before maturity. There is nothing different in the mode of cultivation from the old kind, except that it is desirable to plant on new ground. The plants then grow rapidly and mature before the sun has lost its full warmth, thereby insuring the light and bright color which is so desirable with purchasers. The beds should be sown as soon as the ground is dry enough to work, the land well prepared by plowing and harrowing—a ridge made by throwing three furrows together, three feet apart and marked across same distance—that the crop may be mainly cultivated with the plow. The plants are topped at from twelve to twenty leaves. The time for cutting can only be learned by experience, but will be indicated by the breaking of the leaf when pressed between the fingers. After it is cut and hung on scaffolds out of doors it should remain so, exposed to the sun for ten days, or until the leaf has acquired a bright yellow hue. It must then be put under cover in a house, not ventilated, so that there may be no danger of "house-burning." This kind of tobacco has been sold this year at from $15 to $25 per cwt., and often as high as $50 when prepared for market with care.

Fertilizers are not used in Ohio when new land is cultivated; farm-yard manure is preferred and used almost exclusively in most tobacco counties for old land. In Vinton County, after stripping off the leaves in the field, hauling to tightly constructed houses, and stringing on strings with a flat needle, and curing three days with furnace heat, the stock is ready to take down and pack for market.

In Indiana also farm-yard manure is required for old ground, on which the largest crops are secured. In most tobacco-growing counties air-curing is practiced, first on scaffolds and then in houses. Hickory lands are in great request for tobacco. Very rarely are fertilizers used in Illinois, fresh lands being mainly employed, yet farm manure is used somewhat upon fields long cultivated. Curing is done in open barns, or on scaffolds, and in houses.

Missouri tobacco is largely grown on fresh soil, land being plenty, and the culture given to this crop being an excellent preparation for wheat and other crops. If a fine quality of manufacturer's leaf is wanted, a thin soil is selected on oak and hickory uplands. If more than two crops are taken, inferior quantity and quality result. In rich soil on pin-oak land a dark, heavy article is grown. Fertilizers are scarcely ever used; on a small portion of the area, always in old ground, farm manure is applied. Clover-sod is also cultivated profitably in tobacco. The old mode of curing is largely practiced; in some districts charcoal-curing has been introduced, with increase of price to the extent of 25 to 50 per cent. What is called the "Yankee plan" has been adopted by some—stringing the leaves with a needle and fastening the strings to the ends of the sticks.

MARKETING.

Some of our correspondents make note of the mode of packing and marketing. The crop of Litchfield County, Connecticut, was mainly bought, hanging on the poles, at 20 cents per pound. It is mostly delivered at the packing-houses of New Milford in bundles of 8 to 12 pounds, where it is sorted into four to six qualities, and packed in cases of 375 to 400 pounds each; and, during the months of May and June, undergoes a sweating, and becomes ready for market in August and September. Much of the last crop in Tolland County was sold before curing at about 35 cents. Little of the New York production was sold until February.

In Maryland the stripping is done through the winter and spring; packing into hogsheads during spring and summer; and about one-half is usually sent to market as early as August. A portion of the finer qualities is used in this country, but most of the crop goes to Europe, where much of it is used for smoking. The Montgomery County packages vary from 500 to 1,000 pounds.

The fine tobacco of North Carolina is mostly taken to local manufactories in a loose state. The coarse grades are, in part, sent in the same manner, and a portion is packed in hogsheads, under pressure. The Warren County crop is packed in hogsheads of 1,200 pounds, and sold in Virginia, at Petersburg and Richmond.

The Robertson County, Tennessee, crop goes mainly to Germany, France, Italy, and to Africa, except a small quantity of very fine dark wrappers taken by home manufacturers. In Barren County, Kentucky, after stripping, it is tied in bundles of twelve leaves each, and put into hogsheads holding about 1,500 pounds. In Christian it is assorted generally into two classes, known as leaf and lugs, two-thirds to three-fourths being leaf and the remainder lugs, packed into hogsheads of

1,400 to 2,000 pounds, according to quality. In Simpson, most of the crop is sold in the hand to speculators. Most of the western tobacco is exported.

EXPORTS.

A statement of the exports of tobacco in all forms, since 1866, is as follows:

Years.	Leaf-tobacco.	Value.	Manufactured tobacco.	Value.	Snuff.	Value.
	Pounds.	*Dollars.*	*Pounds.*	*Dollars.*	*Pounds.*	*Dollars.*
1856	.....	12, 221, 843	10, 008, 606	1, 809, 157	86, 055	20, 050
1857	.....	20, 260, 772	7, 456, 666	1, 447, 027	50, 401	11, 526
1858	.....	17, 009, 767	11, 210, 574	2, 400, 115	37, 245	10, 109
1859	.....	21, 074, 038	14, 912, 811	3, 334, 401	239, 148	68, 090
1860	.....	15, 906, 547	17, 697, 309	3, 372, 974	39, 923	11, 354
1861	.....	13, 784, 710	14, 783, 363	2, 742, 828	81, 465	17, 703
1862	.....	12, 325, 356	4, 071, 963	1, 068, 730	38, 839	7, 914
1863	.....	19, 752, 076	7, 025, 248	3, 384, 544	44, 924	13, 633
1864	.....	22, 845, 936	8, 586, 494	3, 603, 756	28, 277	16, 813
1865	.....	41, 592, 138	7, 294, 165	3, 439, 979	93, 159	39, 129
1866	190, 826, 248	29, 456, 145	6, 515, 709	1, 794, 689	18, 920	7, 981
1867	184, 803, 065	19, 620, 159	9, 601, 142	2, 795, 008	24, 342	12, 576
1868	206, 020, 504	22, 898, 823	10, 470, 024	3, 100, 084	11, 393	8, 730
1869	181, 527, 630	20, 552, 943	.....	2, 759, 005	31, 497	20, 252
1870	185, 748, 881	21, 100, 420	.....	1, 582, 995	20, 181	12, 226
1871	215, 667, 604	19, 908, 797	.....	2, 022, 434	18, 724	11, 683
1872	234, 936, 892	24, 136, 166	.....	2, 511, 866	15, 092	5, 241
1873	213, 995, 176	22, 689, 135	.....	2, 627, 585	12, 196	7, 462
1874	318, 097, 804	30, 399, 181	.....	2, 537, 782	15, 716	7, 092

A small quantity of cigars exported is not included in this table.

REPORT OF THE HOUSE COMMITTEE.

Mr. Begole, from the Committee on Agriculture of the House of Representatives of the United States, to whom was referred so much of the President's message as relates to agriculture, submitted the following report; which was ordered to be printed:

The committee have spent considerable time in examining the working and operations of the Department of Agriculture, and find it in charge of a practical and experienced farmer and able and efficient officer, assisted by a corps of efficient heads of divisions. Notwithstanding the Commissioner has been to some extent hampered by a lack of adequate appropriations, the operations of the Department for the year 1874 show a very satisfactory exhibit.

After a very unusual delay, Congress at its last session provided for the printing of a small number of the annual report of the Commissioner of this Department. Fifty thousand dollars was appropriated for this purpose. The Congressional Printer printed and bound about twenty-seven thousand copies of the report for 1872, and one hundred thousand copies of the report for the year 1873. Between forty-five and fifty thousand copies of the report for 1873 have been delivered at the folding-rooms of the House of Representatives and Senate, and are now available for the use of members of the two Houses.

The committee find that the delay in the printing of these reports was a great disappointment to the farming community all over the country, as it is the only work issued by the Government in which the farmers are personally and directly interested. When it is remembered that the last census established the fact that one-half of the population of these United States are either directly engaged in agricultural pursuits or are wholly dependent upon them for their support, that would certainly be a wise policy which would foster the only branch of the civil service devoted entirely to the interests of this great producing class. The commercial and manufacturing interests of this nation are of great importance, but they are both secondary when compared with the important interests involved in agriculture. Notwithstanding the vast improvements in agricultural machinery, the recent wonderful discoveries in agricultural chemistry, and the still greater discovery in the growth and formation of plants, the Government seems to take less interest than formerly in fostering this important and really paramount branch of industry.

We are pre-eminently a nation of farmers, and as such are likely to remain for many generations to come. Our temperate and stimulating climate, the variety of our soil, and the great diversity and range of latitude and elevation, give us almost every climate and condition of temperature necessary for producing all the valuable plants and fruits in the greatest abundance. The rural tastes of our people and the vast domain of territory yet unopen to homestead occupancy combine to assure not only a continuance but an increase in the interest hitherto manifested in agricultural pursuits.

It is a source of regret that so few members of either House of Congress visit the Department of Agriculture and examine its workings. The committee have derived both pleasure and profit from visits to this Department. If members from agricultural districts, without regard to their professions, would give this Department of the Government a small share of their time and attention, it would be a source of great encouragement to the officers of this Department, and very much lighten their labors.

The extensive correspondence of this Department is strong proof of its importance to the entire country. At this season of the year the letters received and answered will average one thousand per day, and some days amount to two thousand, and even three thousand, and yet, with this amount of work, the correspondence of the Department is usually kept up to date.

Not only as evidence of the importance of this branch of the public service, but as proof that the Commissioner of Agriculture properly appreciates the great work intrusted to his care, the following quotation is given from his last preliminary report to the President, which will accompany his annual report for 1874, and which has already been made to this House and ordered to be printed:

"It gives me great pleasure to know that the operations of this Department for the past year have served to awaken and greatly increase a spirit of improvement in the agricultural interests of the country. A territory so extensive as ours, possessing every variety of fertility and every diversity of climate which are congenial to the productions of the earth, and with a population whose habits, manners, customs, enjoyments, and wants differ as much as the climate in which they live or the countries from which they come, requires a supervision which shall adapt itself as much as possible to an appreciation of their condition, meet their wants, and make that provision for their necessities and improvement which their situation will not allow them to make for themselves. The isolated situation of the farmers affords them few opportunities of keeping step with the rapid march of the world's progress, and any aid which can be given them by this Department is as strongly marked as it is highly appreciated. For their benefit, it has been the province of this Department to seek for the best seeds which the world can supply, to study their adaptation to the soil and climate of the country, and to put them into the hands of those who will make them profitable to the section where they respectively reside. When any discovery is made in the method of cultivation or propagation, it is promptly communicated through the medium of a monthly publication. Many persons, in this and other countries, are constantly engaged in experiments to improve seeds and plants, as well as the discovery of new methods for their cultivation, whereby the work of the farmer may be made more profitable. These are anxiously watched and the results promptly communicated, and, when successful, availed of by extensive distribution. The counsel, advice, and information of the Department are cheerfully given to all persons who apply on any subject which pertains to the interests of agriculture."

The principal means of communication between the Department of Agriculture and the farmers of the country is the annual report of the Commissioner. This work contains statistics of vital importance to the farming community, and its non-appearance creates dissatisfaction among that large class engaged exclusively in the tillage of the soil and other classes dependent upon them for support.

It is sincerely to be hoped that Congress will hereafter promptly provide for the printing of the usual, if not a larger, number of copies of this valuable work. It is only through its statistical division that reliable data can be obtained as to the condition, prospects, and results of the cereal, cotton, and other crops of the country.

With from one to four correspondents in each county of almost every State and Territory of the Union, the Department is enabled to furnish information of great value, at stated periods of each month, as to the probable production of any given crop. The returns from these correspondents are carefully studied, estimated, tabulated, and published, not only for the benefit of the farmers, whose interest is paramount to all others, but also for the benefit of the merchants and manufacturers who deal in the various productions of the farm and garden. By this means legitimate parties are protected from the rapacity of the speculator, who deals most profitably upon fabricated reports.

So reliable has this information become that its effects upon the markets of the country are very perceptible by nearly all business men, and it has therefore been found necessary, of late years, to carefully guard this information up to the hours of publication. These are current facts which appear in the monthly reports.

The annual report contains a condensed statement of the operations of the year, and of course embodies information concerning the growth and development of the country which cannot be obtained through any other channel.

As this information is intended for the benefit and encouragement of the great producing class of the country, Congress should not hesitate to grant whatever appropriations may be deemed necessary to render the Department useful and efficient in the discharge of the important duties intrusted to it.

Referring to the Congressional Record, it is shown that Congress authorized the publication and made adequate appropriations for the printing of 165,000 copies of the annal report of the Commissioner of Agriculture for the year 1865, 225,000 copies for the year 1870, 225,000 copies for the year 1871, and but 25,000 copies for the year 1872, and 100,000 copies for the year 1873.

What disposition of the report for the year 1874 will be made by Congress remains to be seen.

From the daily correspondence in the hands of the Commissioner of Agriculture, the importance of procuring new and valuable seeds is made quite obvious. Varieties of the cereals formerly prized here have been from year to year deteriorating, and the product per acre of staple grains has been steadily diminishing. Perhaps one of the principal causes of deterioration is the slight attention paid by farmers to the selection of seeds; but, while this is the case, it should be remembered that securing the very best seeds is not all that is necessary. The very best seeds, those that yielded most abundantly on the best-prepared soils, will either fail or show a poor return on worn-out or poorly-prepared soils. While this is the case, there seems to be no good reason why farms that at one time yielded thirty bushels of wheat per acre should now produce only from twelve to fifteen bushels per acre.

As evidence of the great benefit to accrue to the material and productive interests of the country, as reached by the operations of the Department of Agriculture, it will only be necessary to call your attention to a single instance to fully illustrate this. As shown by reliable returns, the oats-crop of 1868 amounted to 254,960,800 bushels; acreage, 9,665,736; average yield per acre, 26.36 bushels; value of crop, $142,484,910; average price per bushel, fifty-five cents.

Reports of experiments with the "Excelsior oats," a new variety imported by this Department for this and former years, show an average production of forty bushels per acre, sixty bushels not being an uncommon yield. Estimating the average production per acre, if generally introduced, an increase of but four bushels per acre over the average yield of 1868, and the addition to the wealth of the country in the item of oats alone would be 38,622,944 bushels, or $21,264,619 in value. The weight of the product of this variety of oats, for a few years after its introduction, may be fairly averaged at twenty-five per cent. above the common kinds, estimating the latter at thirty pounds per bushel and the former at thirty-six pounds, although in many cases forty and forty-five pounds per measured bushel have been reported. Add twenty-five per cent. to the sum above ascertained, and an increase will be shown in the productive industries of the country of the enormous sum of $25,517,542 per annum.

Other new and valuable seeds introduced by this Department have shown equally gratifying results.

As before stated, our great diversity of soil, climate, and elevation gives our country an advantage over any other single sovereignty in the civilized world. Unlike most other countries, we export all the productions of the soil necessary to sustain life. There is scarcely a cereal, a plant, or a fruit that we cannot produce here in the greatest abundance. Our territory is extensive, and its climate is as varied as its miles and degrees in latitude and longitude. While on the north we have a climate in which all the hardier plants and fruits may be raised in the greatest abundance, on the south we have a climate varying from temperate to tropical, where all the semi-tropical fruits and plants may be raised at a profit to the producer.

Your attention is called to the efforts of the Commissioner to impress upon the people of the Southern States the importance of the cultivation of the jute-plant, which has become an article of great commercial importance.

The report of the directors of the State Agricultural Society of California for the year 1872 shows that the wheat-crop of that State alone amounted to about thirty millions of bushels.

Owing to the high price of sacks and no timber in that country suitable for making flour-barrels—the product must always be shipped in the grain in sacks—and the limited facilities afforded for transporting this immense yield of grain to market, the producer receives but a small return from the crop. After appealing to the farmers of the State to provide against such contingencies hereafter by purchasing their sacks rly in the season, the directors say: "Nearly all of our grain-sacks are now made of the fibers of a plant called jute. The principal place of production of this plant is now in India, in the British possessions of that country, and the principal place of its manufacture, not only into cloth but into sacks, is Dundee, Scotland. The cost to the farmers of California to sack their last crop of wheat was not less, but probably more than $2,450,000.

At the ruling prices of wheat at the time these sacks were bought and paid for, it required 2,722,220 bushels of wheat, or a little more than one-eleventh of all the wheat produced, to pay for them. This large amount of money was subtracted from the profits of the farmers of the State to pay for the labor of producing the raw material in India, the freighting of that raw material to Dundee, the manufacturing of it into sacks, and finally freighting them to San Francisco and distributing them throughout the State, with the addition of the profits of the merchants, brokers, insurance-houses, &c."

Since this report was made it has been demonstrated that the rich bottom-lands of California, particularly those in the southern section of the State, and large sections of our other Southern States, where facilities for irrigation are at hand, produce not only a good plant and material, but actually as abundant as the best localities in India. Last year the Commissioner of Agriculture imported, direct from India, a large amount of jute-seed, which was principally distributed among the farmers of California and to those of the Southern or Gulf States, where it has been shown that it can also be produced abundantly and profitably.

The "ramie plant," another fibrous plant of great value, was some years ago introduced by this Department, and is succeeding well in the Southern States. So important are these new sources of industry regarded that immense sums of money are now being invested in perfecting machinery for the manipulating and manufacture of the fiber. Specimens of both the raw material and the manufactured goods are to be seen at the Department of Agriculture.

It is certainly the duty of the Government to encourage the growth and development of all new enterprises that promise to better the condition of our people, to assist in developing new interests that are likely to add to our prosperity and happiness as a nation, by causing us to be less dependent upon foreign governments for supplies which can be produced most abundantly here. The soil and climate of California and many of the Southern States is adapted to the successful cultivation of jute, ramie, New Zealand flax, cotton, silk, coffee, tea, opium, rice, and the various kinds of tropical fruits, such as the pine-apple, banana, mango, cocoa-nut, plantain, and many other valuable fruits, and medicinal and coloring plants, while the Northern and Middle States produce abundantly of hemp, flax, all the cereals, pork, beef, mutton, and wool.

The past year was one of more than average prosperity to the farming community, and since the marketing of the crop of 1874 a very perceptible improvement has taken place in the commercial interests of the country. The question of cheap avenues of transportation is one that still claims the attention of those engaged in farming operations. While the farmers of the country do not desire to interfere with the lawful and just rights of transportation companies, they feel that they have important and even vital interests involved in the controversy, and are of the opinion that some equitable means might be devised whereby these companies would be compelled to show less discrimination in favor of certain market points.

A very large portion of our western territory and several of the newer States of the West was overrun by grasshoppers during the growing-season of last year, and immense damage was caused by their ravages. Portions of Kansas, Nebraska, Iowa, and Minnesota, and the Territory of Dakota suffered fearfully. Such a scourge has never swept over any part of this great country before. The growing crops, in fact all vegetation, were all swept away as by a devastating fire, leaving neither food for man nor beast, and the people in a destitute condition. Notwithstanding the many noble efforts for the relief of these people, much suffering has already been felt, and it is feared that the worst has not yet been experienced.

The Government promptly authorized the distribution of one hundred thousand dollars' worth of Army rations for the relief of the sufferers, and more recently Congress has appropriated thirty thousand dollars for the purchase and distribution of seeds for the renewal of their crops in the coming spring. The help thus afforded has relieved much distress and suffering, but still further assistance is called for.

The committee would recommend Congress to grant without delay whatever assistance lies within its legislative province for the relief of these distressed and suffering people.

CHEMICAL MEMORANDA.

By Wm. McMurtrie, Chemist.

Mr. Abram McMurtrie, of Belvidere, Warren County, New Jersey, has for many years past made use of the dark, steel-gray limestone of that locality, for agricultural purposes, and has repeatedly found that the lime produced from it seemed in nearly every case to have a rather

injurious effect, but was wholly unable to account for it. When the lime was placed out in open fields to slake, the spots occupied by the heaps, even when the lime was removed very carefully and no appreciable quantity was left behind, remained perfectly barren for two or three subsequent years. Very frequently the crops to which the lime was applied showed indications of an injurious action in a very decided manner, and this influence always appeared more marked in wet than in dry seasons. In fact, a wet season sometimes determined a complete loss of the whole crop, especially when it happened to follow immediately upon the application. Believing that a change in the kind of lime employed would at least occasion no loss, Mr. McMurtrie was induced to try a lime produced from stone taken from a quarry three or four miles distant, and said to be particularly beneficial in its results. This limestone was of very light gray color, somewhat resembling granite in appearance, and the lime produced from it, when thrown out in heaps to slake, though rather dark at first, upon slaking changed to a light buff-color. Its effects seemed to be almost directly opposite to those of the lime previously employed, and the difference between the effects being so decidedly marked, it was considered of some importance to investigate the cause of this action by means of chemical analysis. Samples of the limestone were therefore obtained and analyzed with the following results:

No. 1 is a sample of that producing the beneficial results. It was obtained from a vein running across the farms of George Radle and Philip Raub, near Oxford, and has the following composition:

Moisture	0.70
Carbonate of lime	92.61
Carbonate of magnesia	0.914
Oxide of iron and alumina	2.06
Silica	3.75
	100.034

No. 2 was obtained from the quarries of Mr. A. Depue Roseberry, near Belvidere, and has the following composition:

Moisture and organic matter	1.30
Silica	3.31
Peroxide of iron and alumina	2.12
Carbonate of lime	51.20
Carbonate of magnesia	42.10
Phosphoric acid	trace.
	100.03

No. 3 was taken from the quarries of E. J. Mackey, located very near the boundary of Belvidere. The analysis resulted as follows:

Moisture and organic matter	1.40
Silica	2.13
Peroxide of iron and alumina	0.82
Carbonate of lime	56.80
Carbonate of magnesia	38.31
Phosphoric acid	Trace.
	99.46

A glance at these analyses is sufficient to show that the deleterious effects of the lime produced from the limestone from the quarries represented by Nos. 2 and 3 are due to the high percentage of magnesia they contain, and that the beneficial effects of the other lime is due to the absence of this constituent.

Many agricultural chemists acknowledged as authorities fail, in their

writings upon the subject of mineral fertilizers, to note the fact of the injurious action of caustic magnesia upon vegetation, and in fact the only writer who seems to have recognized it is Sir Humphrey Davy,* who reports experiments upon this subject made by himself, and others made previously by Mr. Tennant. He explains the injurious effects upon the theory, since confirmed by experiment, that caustic magnesia in presence of caustic lime absorbs carbonic acid very slowly, and that on this account remaining a long time in the soil in the caustic state exerts the deleterious influence noticed in the limes mentioned above. The limes in question were applied to rather light sandy or gravelly soil, but, according to Davy, the same lime might be applied to heavy soils, containing considerable quantity of organic matter with decidedly good results, and that upon light soils, where pure lime is not obtainable, the magnesian limestone should be applied in small quantities. The caustic action of the magnesia may in such cases be very materially ameliorated by a tolerably heavy application of stable-manure. In the locality in New Jersey referred to, however, we would advise those farmers who have suffered the inconveniences and losses resulting from the use of magnesian limestones to employ the other, even though they may be subjected to greater expense in the matter of transportation.

It has been suggested that the magnesia combining with water and silica forms a hydraulic cement in the soil, and that the injurious effects are due to such a combination.

This can not, however, be considered a correct theory, since these magnesian limestones have been used upon clay soils and their application to such soils has no deleterious effects. It would seem that the magnesia reacting upon the silicate of alumina forms a double silicate of alumina and magnesia, thus neutralizing its causticity, and that the injury consequent upon the application of magnesia lime to sandy or gravelly soils is to a large extent due to a deficiency of clay.

The following are the results of a sample of dark-colored cranberries from New Jersey:

Moisture	86.50
Organic matter	13.25
Inorganic matter	0.25
	100.00

The inorganic matter contains:

Insoluble silica	0.874
Soluble silica	2.563
Lime	2.710
Magnesia	trace.
Peroxide of iron	1.253
Phosphoric acid	19.309
Sulphuric acid	5.870
Chlorine	1.260
Potassa	56.683
Soda	9.338
	99.860

The supplement to the Mark Lane Express for February, 1875, contains an interesting paper communicated by Professor Church to the members of the Cirencester Chamber of Agriculture, showing the results of a number of analyses made in the interests of agriculture. The substances analyzed consist principally of fertilizing and feeding materials. One peculiarity in mixed-seed cakes analyzed, which had an

*Elements of Agricultural Chemistry, London, 1814.

injurious effect upon the animals fed with them, was the presence of *tin* scraps in small particles. This amounted to not more than one part in one thousand, but in the case of a waste bran which was analyzed it reached five parts per thousand. He also notices the fact that spent bran obtained in England often contains oxalic acid, sulphuric acid, and blue vitriol; that barley-meal is adulterated with wheat-flour, and that both are often adulterated with sulphate of baryta, and more frequently with ground gypsum. In fact, he cites one "mixing stuff" which contained 72 per cent. of gypsum and nearly 8 per cent. of fiber. These facts, while they are of very great value to English agriculturists, are not devoid of interest to American producers and consumers, especially in the easterly portions of our country, where adulteration is being practiced to considerable extent.

Among other analyses he gives the following, showing the composition of *Gallega officinalis*, a leguminous plant which has been proposed as a substitute on clover-sick lands, and which is somewhat similar to lucerne:

Analysis of Gallega officinalis.

	In 100 parts of the—		
	Fresh plant.	Dry plant.	Seed.
Moisture	81.9		14.9
Oil, &c	1.3	6.5	7.0
Flesh-formers	4.1	22.9	33.2
Sugar, starch, mucilage, and digestible cellulose	6.9	38.8	31.6
Indigestible fiber	4.5	24.8	10.4
Ash	1.3	7.0	2.9
Total	100.0	100.0	100.0

BOTANICAL NOTES.

By Dr. Geo. Vasey, Chemist.

In the Garden (London) for February 13, mention is made of an American plant, *Xerophyllum asphodeloides*, which has found its way into cultivation in England, although very little known here in its own country. The writer says:

I saw this rare and beautiful hardy plant, which grows in grass-like tufts, flowering freely in the York nurseries last summer. Its leaves are from 4 to 20 inches in length, and not more than the eighth of an inch in width. Their upper surface is flat, the under sides convex and furrowed, and the edges are furnished with minute teeth resembling those of a miniature saw. The longer leaves are gracefully recurved, while the shorter ones, which are in the center, are more or less erect, forming altogether a graceful circular plume. The flowers, which are white, are produced in an erect spike from 12 to 18 inches high; and although the individual flowers are not large, yet, owing to the abundant way in which they are produced, the general effect is most beautiful, the erect stem contrasting, in a striking manner, with the tufts of graceful recurving leaves at its base. When this plant comes to be better known, it will doubtless be extensively used for table and other decorative purposes, for which it is admirably adapted, as the leaves are of such a texture as to withstand the effects of dry air and gas. This I have proved, having had a plant of it in a room during the past three weeks. The pot in which it grows is placed on the stand of a moderator lamp, the base of which is surrounded with ivy-leaves interspersed with a few flowers, while the longer leaves of the *Xerophyllum* gracefully recurve, and fall over and conceal the upper portion of the stand, thus forming a very pleasing and ornamental object, and one which has been greatly admired. Although this plant will grow and thrive tolerably well in ordinary garden soil, yet it succeeds best when planted in a compost consisting of equal parts

of peat, loam, and white sand. It forms a handsome object planted on rock-work. It is a common plant in the pine barrens of North America, from New Jersey and Oregon southward.

The closing sentence will, perhaps, need a little explanation. It would seem to convey the statement that the plant grows over the entire country from New Jersey to Oregon, and thence southward. It is really confined to a somewhat narrow belt of sea-coast from New Jersey to North Carolina, but what appears to be the same or a closely allied species, is also found on the Pacific coast from Oregon to Mexico. Why is it not as deserving of attention in cultivation at home as abroad?

In the same paper is a list, accompanied with commendatory remarks, of "some flowering trees and shrubs of North America," in which are named the Stuartia and Gordonia, (Loblolly Bay,) the magnolias, the tulip-tree, red bud, fringe tree, silver-bell tree, (*Halesia*,) dogwood, (*Cornus florida*,) catalpa, witch-hazel, mountain-ash, (*Pyrus Americana*,) crab-apple, and several species of *Prunus*, among which, by some error, is mentioned the *Prunus cerasus*, the sour or Morella cherry, of which it is said, "The sour cherry is the most valuable of the native American cherries." The fact is that the Garden Red or sour Morella cherry is an introduction from Europe.

FACTS FROM VARIOUS SOURCES.

Cheese-making at high altitudes in France.—A writer in *Le Journal Pratique d'Agriculture* presents a characteristic phase of French rural economy in his account of the cheese-manufactory of M. Charles Durand, who took the prize medal at the *Concours Regional Agricole* of Mende in 1874. Mende is one of the three arrondissements of the department of Lozère, in Southern France, an isolated, mountainous region consisting mostly of a plateau from 2,300 to 3,000 feet above sea-level, above which numerous mountain-crests rise beyond the line of perpetual snow. Grain-culture in such a region is limited to a few localities, and its scanty yield of food is eked out by chestnuts, acorns, and other spontaneous products of the forest. The population is scanty, poor, indolent, ignorant, and, as might be supposed, intrenched in local prejudices. Many of the workingmen migrate to neighboring departments during the summer months to win a precarious subsistence for their families by day-labor at low wages. Agriculture here is mostly pastoral and primitive. Farming capitals are small, and the amount and character of live-stock held are generally indifferent. The processes and implements of culture are also very rude. Yet this unpromising region has attracted a few enterprising and intelligent agriculturists, whose labors in utilizing its imperfect resources have developed very unexpected and gratifying results. Among these M. Durand has made a tract of bleak mountain-land the scene of a profitable stock-raising and cheese-manufacturing industry. His estate, known as Salles-Basses, consists of 1,010 acres, of which 185 are in meadow, and the remainder in natural pasture, interspersed with "bouquets" of trees. It is located in the mountains of Aubrac, about fourteen miles from Marjevols, and at an altitude of 4,382 feet above sea-level, where heavy snows, long winters, and rigors of climate render cereal culture impossible. Here, comfortable dwellings, large stables and granaries, and two large cheese-factories (*burons*) have been built; large areas have been inclosed, and extensive labors for sanitary and soil improvement and irrigation have been executed. Meadows already exist-

ing were brought to maximum fertility by judicious fertilization and irrigation; good pastures were transformed into meadows, and in the ordinary pastures the sod was made to extend itself gradually over heather and moor. These results have been accomplished by soiling animals, leveling, draining swampy declivities, and utilizing the surplus waters for irrigation, &c. The pastures are fertilized successively by shifting the stock-inclosures, and the meadows by stable-manure, which is carefully preserved. In the case of milch-cows with calves, only the latter are kept constantly inclosed; the mothers, being allowed free range, are kept by maternal affection near their offspring, thus concentrating their droppings upon a small surface. The fences are high and close, in order to protect the animals from the severe winds of the region, and consequently to increase their flow of milk.

The herd consists of 400 animals, of which 200 are milch-cows. The latter are gathered into two large ranges. Of the 400 animals, about 150 belong to M. Durand, and the remainder to other parties, who pay for their sustenance and care. He usually charges 25 to 30 francs per head for pasturing young cattle from May 25 to October 13. In the case of milch-cows, M. Durand generally uses the milk for cheese-making and allows the owners a money equivalent. This it is difficult if not impossible to average, for cows vary in the proportion of caseine in their milk. His own animals consist of 30 calves, 6 beef-cattle, 24 bulls of one, two, or three years of age, 25 heifers, and 65 milch-cows. Only 100 of these animals are wintered on this estate, the residue being sent to another property of his in the department of Aveyron. Defective and inferior animals are sold in October. The small product of milk and butter during the winter season is mostly consumed on the farm.

Six or seven hands are employed perpetually at $50 to $60 per annum, with board and lodging. About as many more are employed during the summer, at $30 to $35 for the season, with board and lodging. M. Durand resides on this place about three months during the year, usually from June 20 to September 20, and makes occasional visits during the remainder of the year. The farm is in charge of a foreman. All the draught labor is performed by oxen; half a dozen horses, half Arab and half English blood, are used for the pleasure of the owner and his family.

The specific industry of Salles-Basses is cheese-production. M. Durand, after ten years' experiment, gave up the raising of fat calves. In winter the dry food is too rich and unhealthy. It induces chronic irritability in the mother and a destructive diarrhea in the calves dropped during that part of the year, very few surviving. In summer the restriction of cows to green grass produces other equally fatal intestinal diseases, involving a burden of care and expense which has induced the proprietor to abandon calf-raising altogether and to concentrate his efforts upon cheese-making. One of his neighbors, an intelligent agriculturist, criticises this policy, and intimates that the above-named difficulties could be disposed of by proper management.

The main productive element of M. Durand's enterprise, then, is the cheese-product of 200 cows, which leave the stable about May 25, and return October 13, making the average pasturing and milking season one hundred and forty days. During the first eighty-one days, from May 25 to August 15, the daily average yield of milk per cow is 5 liters, or 1.32 gallons. M. Durand estimates the average cheese-product at 113½ grams per liter, about equal to 15.2 ounces per gallon. The daily cheese-product of the period is then 113.500 kilograms, or nearly 250 pounds. The total product for the eighty-one days is 81,000 liters, or 21,398 gallons of milk, yielding 9,193.5 kilograms, or 20,270 pounds

of cheese. During the next twenty-five days, from August 15 to September 9, the average daily yield of milk per cow is reduced 20 per cent., amounting to 4 liters, or 1.0567 gallons. The daily cheese-product falls in the same proportion, amounting to 90.0080 kilograms, or about 198½ pounds. The total product of the period is 20,000 liters, or 5,285 gallons, yielding 2,250 kilograms, or 5,960 pounds of cheese. During the closing period of thirty-four days, from September 9 to October 13, the daily average yield of milk per cow is stated at 2.6 liters, or 3.8 quarts. The daily cheese-product of the herd is 59.02 kilograms, or 130.12 pounds. The total product of the closing period is 17,680 liters, or nearly 4,660 gallons, yielding 2,007 kilograms, or 4,424 pounds of cheese.

The total yield of milk for the season of one hundred and forty days amounts to 118,680 litres or 31,353 gallons, averaging 847 liters or nearly 224 gallons per day. The total cheese-product was 13,450 kilograms, 29,754 pounds, averaging daily 96.07 kilograms or 212.52 pounds.

The established price of cheese is 1.20 francs per kilogram, or nearly 11 cents per pound. The total receipts of a season are stated at 16,165 francs, from which deducting 4,640 francs for the use of cows belonging to other proprietors, and about 7,000 francs for the total expense of the estate, there remains a profit of 4,525 francs from the cheese industry alone. The sale of animals, especially hogs, fattened upon the refuse milk and whey, raises the average annual profit of this enterprise to about 12,000 francs, or $2,400. The amount of whey left from cheese-manufacture is sufficient to fatten not only the hogs raised upon the estate, but also about 24 hogs belonging to neighboring proprietors, who pay about 25 francs per head from June 1 to October 13. Each day's residuum of whey is placed in vats, and kept for four to eight days, in order to allow the butter which it holds in solution to come to the surface. This butter is gathered and used for cooking; it is also placed upon the tables of the workmen. It is of course not remarkably palatable, as it contracts a certain sourness of taste in the acid whey, which has also dissolved a portion of its substance. The whey is, on the whole, a good diet for hogs, though as the weather becomes warm it acquires a strong odor from partial decomposition. The hogs devour it greedily. At first its effect is cathartic, but this is only temporary. The growth of the animals in size, flesh, and fat is normal, producing excellent meat.

The two buildings, denominated by courtesy cheese factories, (*burons* or *chalets*,) are very simple structures, with earthen floors and surmounted by lofts which serve as dormitories for the workmen. The main story is divided into a large room furnished with implements for making cheese and a cellar for storing it. The utmost cleanliness and thorough ventilation are strictly enforced in every portion of the building. All the utensils are daily scalded, washed, and dried, and the last trace of acidity is removed before they are again used. Even a fine lady would find no need of her vinaigrette to ward off any disagreeable odors. The workmen are jolly, robust peasants, from twenty to thirty years of age, who in all respects meet the writer's ideal, except in *kneading* the curds with their *knees*, a practice which he justly reprobates on the score of decency.

The cows are milked daily, at 4 o'clock a. m. and at 3 o'clock p. m. Three or four men milk 100 cows with a remarkable promptness and address. The animals are brought near the inclosure and treated to a handful of salt, when the calves are allowed to draw the udders for a few seconds; these are then drawn back a little and the milking is rapidly completed. Without these precautions the cows would refuse to yield their milk; greater care is necessary in hot weather than in

cold weather. The milk-buckets are immediately emptied into large wooden vessels, which are carried to the factory on the shoulders of porters by means of flexible poles. The milk, which is seldom heated, is immediately strained into large vats holding about 30 gallons each, and treated with rennet. The writer thinks that the excess of coagulable matter produced by the copious infusion of rennet accounts for the sharp taste of the cheese-product.

In about an hour the curd, having acquired proper consistence, is cut with a wooden blade, called *mésadou*, and then worked upon a small round board, pierced with holes, with a sort of staff or club, called *menole*, in order to expel the whey. By slow manipulation a larger quantity of cheese is obtained, but, according to common opinion, at some sacrifice of quality. The curd is then placed in a large, shallow wooden vessel, (*faisselle*,) with holes in the bottom and sides, and the operator, with pantaloons drawn half-way up the thigh, presses it with naked hand and knee, in order to eliminate the last remnant of whey, the animal heat of the body imparting a special quality to the cheese. M. Durand has been persuaded to substitute a more rational process for this rude and primitive one, which in some cheese-farms of that region is carried to a disgusting extreme; the workman, entirely nude, impresses his inferior and posterior muscles upon the curd.

The curd, divided into cakes, after the last-named operation, is subjected for twelve hours to the action of a press, and then allowed to ferment for thirty-six hours in the cellar, where they enlarge in volume, showing, like bread, an immense number of interior cavities. They are then brought out and placed upon a low table, (*selle*,) made of a single piece of wood, creased through the middle with a slight slope and small trench, which carries off the final dripping. The workman then breaks up the cake into small bits, first with a heavy club, and then with his hands. This is for the purpose of salting the cheese, which is then again worked up, placed in a mold, and again subjected to pressure. The mold is composed of three parts: 1, the *faiselle*, or shallow wooden vessel, before mentioned; 2, the *feuille*, a strip of beech-wood, 12 to 16 inches wide, bent into a cylinder; 3, the *guirlande*, a band 2 or 3 inches wide, encircling the mold. The cheese having received the permanent impress of the mold is remanded to the cellar, but it is continually cared for till the time of its delivery. When a month old, it is sold by wholesale at 1.20 francs per kilogram, or nearly 11 cents per pound, to the merchants of Marjevols, who send it to retailers of Paris and of Southern France.

The writer, on the whole, thinks M. Durand's system is the best for utilizing the natural pastures upon the heights of Lozere. The breed of cattle employed is the *Vendéen*, improperly called the *Aubrac*, breed. The animals are selected while calves, and raised by the proprietor. Their excellence is attested by one hundred and forty prizes taken by them in the regional agricultural fairs.

Water-supply of the Suabian Alps.—From a memorial prepared for the Vienna Exposition of 1873 the following facts are condensed: The Suabian Alps form a table-land 3,000 feet above sea-level, with a southeastern slope, broken up in terraces and occasional deep valleys. A few beech forests are almost the only natural vegetation; bare and stony fields greet the eye, relieved by scattered straw-roofed hamlets, inhabited by genuine Suabian peasants, who adhere sturdily to their antique customs. The name of Bauer (cultivator) is aristocratic, and only applied to those who own four horses; he that has two or less is a

söldner, kuhbauer, (renter, cow-farmer,) &c. The eastern portion of this district embraces some of the wildest of the Alps. On the land which is tilled the crops seem as if they grew out of the white dolomitic limestone, which is barely covered by a thin soil, sprinkled with bowlders and outcroppings of the rock strata. The average temperature is 46° Fahrenheit; the rain-fall, 30 to 45 inches. The rain-water collects in natural basins, near which the early settlers placed their dwellings, but as population increased the supply soon became insufficient, and cisterns were built. These were left open, and in summer covered with algæ, and defiled by the putrid streams from the numerous dung-heaps and surface-drainage that was allowed to flow into them.

For a hundred years slight efforts have been made for improvement. The use of cement linings and of tiles in place of thatch have been beneficial, but the supply falls short every summer, and necessitates toilsome carriage from the distant valley up the steep mountain-slopes. Three remedies presented themselves—artificial reservoirs on a large scale, deep wells, or pumping-engines by the valley-streams below. The last seemed most feasible. The king of Wurtemburg authorized an attempt to supply in this way sixty towns, containing 27,500 inhabitants, at a cost of 1,500,000 gulden. Eight streams were selected, and the region divided in eight corresponding districts. In addition to the inhabitants, the stock was to be provided for at an estimate of 40 to 50 liters daily for horses and cattle, and 20 to 25 for sheep, hogs, and young stock. The first proposition from the royal council met with strenuous objections from the inhabitants; the cost was too great; the supply insufficient, &c., &c., showing a want of confidence in the whole scheme. The town of Justingen alone, by the efforts of Justice Fischer, expressed a willingness to make the experiment in connection with two neighboring villages, Ingstetten and Hansen. Work was commenced on the 11th May, 1870, and on the 18th February, 1871, though the thermometer was near zero, the water gushed from the hydrants in the high Alps amid the rejoicings of the inhabitants who gathered from far and near to witness the wonderful sight. Communities that strongly opposed the innovation now begged for its introduction, and the government engineer was accordingly instructed to execute the work as rapidly as circumstances would permit. About twenty square miles have been included in the system, at an average cost of 30 florins per head, of which one-fourth is defrayed by the general government. The yearly running expenses are about 2 florins per head, the water being raised by overshot or breast wheels; and the increased value of land, the capacity for keeping more stock, and security against fire, are amply recompensing the government and people for the outlay.

French agriculture in 1874.—The *Journal Pratique d'Agriculture* says that France during the last year, on the whole, had good harvests of grain, but very poor ones of forage plants. The winter was of moderate temperature, succeeded by severe spring frosts, occurring as late as May, and inflicting serious injury upon grapes and other fruit. The high temperature of summer, though not injurious to wheat, considerably reduced the yield of oats, barley, and mowed crops. The lack of forage shows its legitimate results in the condition of farm-animals in different regions of the country. Scarcity of food compelled the marketing of live-stock with very imperfect fattening. The destructive *Phylloxera* ravaged the southern vineyards, while the silk industry was embarrassed by the presence of insect enemies. Agricultural hand-labor in some departments was in unusually short supply, and commanded exceptionally high wages. In the agricultural regions where the *Phylloxera* caused

the pulling up of the vines, labor was superabundant, but here proprietors and laborers were stricken by the same blow. Upon a general review of the situation, the editor strongly dissents from the official statement of President McMahon that the agricultural production of 1874 was unexampled in the history of France.

Those parts of the country devoted to sugar-beet culture have but little to complain of on the score of crops. They were favored with seasonable weather, and contributed largely to feeding the population by furnishing employment for labor, feed for live-stock, and fertilizing refuse for the soil. The journal, however, complains of the heavy excise duty upon beet-sugar, which has approached that extreme limit in which it ceases to be productive to the treasury. Those parts of France which, from lack of labor, capital, and fertilizers, failed to put in a large crop of sugar-beets will long remember the droughts of 1874. The failure of forage-crops was a severe blow to the farming interest. Many intelligent and practical agriculturists are directing special attention to green maize as a forage-crop, though lucerne, clover, sainfoin, roots, &c., are by no means to be neglected. Maize, however, is recommended for those regions which are not favorable to the production of sugar-beets and their transformation into sugar and alcohol.

During the year a great impulse was given to the trade in fertilizers more or less chemical in their character. Preparations of nitrogen, phosphates, and potassa were extensively used in all sections of the country. The necessity of restoring to the soil all the elements extracted from it was more generally recognized. Natural manures were supplemented with commercial fertilizers. Chemical science has simplified its processes of analysis and multiplied its agencies of investigation through agronomical stations and other institutions. The fertilizing preparations offered the agriculturist have been analyzed at small cost and their true value indicated. It is regretted that Peruvian guano was not subjected to the same test, and that its specific value as a fertilizer was not authoritatively ascertained before going into the hands of the cultivator.

The trade in agricultural implements and machinery seems to have opened upon a new era during the last year. Harvesters, horse-rakes, mowers, drills, straw-cutters, and root-cutters were disposed of in greatly increased number and variety. The steam-whistle was heard in the field. Rival machinery was subjected to numerous public trials. Hand-labor is yielding before machinery.

The improvement of animals for butchery continued, and numerous large regional fairs were held for the exposition of live-stock generally. A new *école des haras* was organized for the multiplication of horses suited to the labors both of war and of peace. The Journal does not very highly appreciate the necessity for this measure in view of the excellent veterinary schools which furnish ample instruction to horse-raisers. It is objected that this measure will do injury by weakening still further the association of the horse-raising interest with general agriculture.

Several large agricultural congresses were held at different points in the country for the discussion of matters of importance to the agricultural interest, such as the reclamation of land, the raising of horses, the preservation of vines, the establishment of agronomical stations, &c. A viticultural congress and a sericultural congress, both held at Montpellier, brought together the leading men in those important branches of French industry.

The Journal complains of the mismanagement of the agricultural school

of Montpellier, and reiterates the general wail of French agronomists over the suppression of the National Agronomic Institute of Versailles. The regional schools, though excellent in their local sphere, can never meet the necessities of agriculture, which demand a national agronomic university of the highest character.

The ministry of agriculture was reconstituted in its higher official *personnel* as well as in its staff of inspectors. The Journal, however, seems to draw but little consolation from this fact, as it suggests a variety of abuses to which the new organization is liable. Among these, political influence is especially dreaded. Yet great hopes are conceived from the high character of the leading agronomical minds of France, and the thorough organization of the agricultural interest. A more intelligent use of capital and labor promises more hopeful results for the future.

SHIPPING CRANBERRIES TO ENGLAND.—Efforts have recently been made by the New Jersey Cranberry Growers' Association toward establishing a permanent business in shipping cranberries to England. It is hoped by this means to substantially enlarge the general market for that article, and to check the downward tendency of prices consequent on the increase in cranberry-cultivation. In the latter part of 1874, Mr. P. T. Quinn, on behalf of the association, visited firms in London and Liverpool with a view to trade arrangements. He found that American cranberries were virtually an unknown article in the London market, but better known in Liverpool. A business house in the latter city informed him that eight years ago five barrels of cranberries would have filled demands of that market, and that in 1873 over one hundred barrels of the fruit were sold there. He remarks that one great difficulty in the way of introducing the raw fruit into England is the entire want of knowledge there respecting proper methods of preparation for table use. Mr. Quinn concludes his report to the association by saying that it will require time, perseverance, and some outlay to fairly introduce American cranberries into England, but that, with well-directed efforts, a large demand for them can be created in that market. Other papers emanating from the association show that some small shipments made to England by that organization at the close of 1873 were unremunerative, and that the lateness of shipment contributed largely to the result. At the time of Mr. Quinn's visit cans of superior cranberry sauce or jam were distributed by him among members of the English press and other parties, and elicited warm commendation. More recently a certain London firm had been constituted the foreign agent of the association.

In a letter to the Commissioner, in March, 1875, from Mr. E. W. Crane, of Caldwell, N. J., a gentleman prominent in the cranberry interest, he says:

> Until within the last eighteen months no organized effort had been made to introduce American cranberries into European markets, though small lots had been shipped, generally at a loss, by private individuals. My own firm (there being at the time no organization disposed to undertake the enterprise) sent specimens of our fruit in the natural state, and also prepared in various ways, to the Vienna Exposition, where they attracted much attention and received an award.

The large American cranberry, *Vaccinium macrocarpon*, is not an inhabitant of European countries. England, Scotland, and northern countries of the European continent possess, instead, the small cranberry, *Vaccinium oxycoccus*, (*V. palustris*, or *V. vulgaris*,) which is found also in our peat-bogs from New England to Wisconsin, and is not in this country considered a marketable article.

PROTECTION TO FARMERS.—The legislature of Vermont recently passed an act constituting a board of commissioners, whose duty it is

to examine, from time to time, and report upon the various commercial fertilizers offered in market within the State. They are expected to ascertain and report the component parts and the intrinsic value of each. The example is a good one for all the States to follow.

WHEAT FOR PORK.—A correspondent in Marion County, Oregon, reports that, in that section, when the price of wheat is low, farmers find they can profitably feed it to hogs, since wheat makes finer pork than any other feed. Some of the best farmers believe it always pays to feed it to hogs when pork will bring 6 cents. The present price is 6 to 7 cents net, and the price of wheat 65 cents.

PROTECTION TO THE BANKS OF THE OHIO.—Mr. J. H. Mather, of Washington County, Ohio, sends to this Department the following communication on this subject:

Every year the river encroaches more and more upon its banks, and thousands of acres of valuable land are annually lost. A simple, practical method of preventing abrasion has been tried by Mr. A. P. Sherman, which now, after thirteen years, gives perfect satisfaction. Mr. Sherman's land lies on a point in the river where the current exerted its full force in washing away the bank. Finding it was washing away so fast that his house was in danger, he determined to prevent further encroachment. When the river was low he set, between the foot of the bank and the water, three rows of posts, 10 feet apart each way. The posts were 6 inches in diameter, 7 or 8 feet in length, and set in the ground five feet deep. He then scattered brush between the posts, care being taken, in cutting and placing, to make it compact as possible. He next pressed it down and confined it by placing over it poles, crossing each other at right angles, and pinning them to the posts. The object of the brush was, to form a lodging-place for the earth washed down from the banks, and to retain the sediment deposited by the water. After the next spring-freshet had subsided the brush was covered with a deposit of sand. In this he planted willows thickly, and protected them from the depredations of cattle. He has never since put any work on it. Now he has a regular grade from the top of the bank to low water, and the bank, instead of washing away, is gaining steadily every year. For several years he has been getting hay from what was formerly the naked beach. His river-front is 22 rods in length, and he estimates the cost of the work and material at not more than $100. For those who have the materials on their own premises it of course would be less.

It is the more important that the banks of the Ohio should be protected, from the fact that the earth washed from them helps to form the bars which are such obstructions to its navigation; moreover, if they were protected the river would become narrower and its channel be deepened. The shoals of the Great Kanawha, which were dredged during the late war, have not yet filled up, because the banks are protected by the timber that has been allowed to remain upon them. If the shoals of the Ohio were to be dredged and its banks protected all along its course, it would be many years before they would fill up. In that case the Government would be saved much of the expense which it is annually incurring for its improvement, and many thousands of acres of valuable land would be reclaimed.

BEET-SUGAR IN EUROPE.—M. Licht, a German statistician, estimates the beet-sugar crop of Central and Eastern Europe for the last two seasons as follows:

	1873–'74.	1874–'75.
	Tons.	Tons.
Zollverein	288,972	255,000
Austro-Hungary	169,000	140,000
Russia and Poland	150,000	130,000
Belgium	70,366	65,000
Holland, &c	35,000	30,000
	713,338	620,000

These figures show a falling off of 93,338 tons.

It is stated in the Journal d'Agriculture Pratique that the amount of sugar taken in charge after defecation, in France, during the first eleven months of 1874 was 237,798 tons, against 206,288 tons in the twelve months of 1873. It is estimated in certain quarters that the French product of raw sugar during the season of 1874–'75 will reach

450,000 tons. In 1865 the export of French raw sugars was valued at 8,000,000 francs; in 1869, 10,000,000 francs; in 1872, 47,000,000 francs. The export of refined sugars rose from 68,000,000 francs in 1869 to 105,000,000 in 1872; 108,000,000 in 1873; and 130,000,000 during the first eleven months of 1874.

MONEY-VALUE OF AGRICULTURAL STATISTICS.—Mr. G. W. Hunt, corresponding secretary of the agricultural society in Marion County, Oregon, states that the farmers in that section are accustomed to turn the statistics of this Department to profitable account; that is, they are largely influenced by them in deciding what crops and other farm-products to raise for market. As a rule, the result proves the basis of calculation a safe one. By way of illustration, he instances that when our first of January statistics indicate a prospective decrease in pork raised on the Atlantic slope, they take the hint and feed every shoat and pig they can muster. This hint has been acted on for several years with success.

CULTIVATION OF SUGAR-CANE IN INDIA.—In the Shahjah-anpur district 41,584 acres, being about 6 per cent. of all the land under cultivation in the district, are reported as planted with sugar-cane. The culture is mainly confined to the central and northern parts. In upland cultivation the land receives from five to fifty plowings, the number varying according to the circumstances and the resources of the cultivator. In estimating expenses, twenty plowings are assumed, costing 8 rupees per acre. The fertilizer used is from heaps collected outside of each village, the main ingredient being ashes. The quantity varies according to the efficiency of the planter in gathering it rather than the requirements of the crop. The ordinary limits are 5 to 8 tons per acre, and the average cost per acre about 1 rupee 8 annas. It is sometimes applied after planting and worked in when hoeing. On the ground of economy, the top portion of the cane alone is used for planting, since that is immature and contains very little juice. As each cultivator saves his own seed its value is not estimated in the cost of cultivation. These seed-canes are cut about one foot in length. In planting, a man follows the plow and places them lengthways along the furrow at intervals of about a foot. The distance between rows is not given. The cost of planting is put at 1 rupee per acre. Irrigation is seldom required before planting. The number of subsequent waterings depends on the season and the means of the planter; the extremes being 1 and 3, the average may be placed at 2, of which the cost, including wear and tear of machinery, is estimated at 9 rupees 7 annas per acre. The cane is hoed about three times before irrigation and once or twice after each watering; in all 6 or 7 times, the average cost being 5 rupees 8 annas. The growing canes are usually, though not invariably, tied up. Stalks from the same stool, or those from two or three adjoining stools, are tied together; cost, 8 annas. The cane is cut close to the ground, and at the same time the leaves and arrows cut off and also the top pieces for seed. The cutters are always paid in kind, receiving the arrows (used as feed for cattle) and five canes per day. As the part which goes to the cutter is not taken into account in estimating the product, no allowance is made for expense in cutting. The average cost per acre of carting the product to the cane-mill is 2 rupees 8 annas, and the annual rent of land per acre, 15 rupees; total cost of the product of an acre at the mill, 43 rupees 7 annas. As the value of a rupee is about 46 cents, $43\frac{7}{16}$ would be just about $20.

In the river-valleys manure is seldom used and irrigation not needed,

but the crop is inferior in quantity and quality and liable to destruction by floods.

ORANGE AND BANANA PLANTING IN FLORIDA.—The following statements are condensed from a paper on the production of semi-tropical fruits, by J. H. Bostwick, United States inspector of customs. The present number of bearing orange-trees in Florida is estimated at 50,000; the number of groves averaging 100 trees each, at 100,000; to which are to be added many larger groves in which the number of trees ranges from 200 to 7,000. The estimated increase of orange-groves in the State, in 1874, was 25 per cent. The larger portion of the orange-crop goes to Savannah and Charleston, from whence it is distributed by steamers to northern cities, and by rail to the interior. A smaller portion goes to Nashville, Louisville, Cincinnati, and other large cities. The production of bananas, mainly limited to the southern section of the State, has proved quite successful and is extending. The plant is easily propagated. One cultivator in Marion County has a thrifty plantation of 12 acres, and it is estimated that the area covered by plants in the State equals 500 acres, and that the number of growing plants exceeds 300,000.

ORANGES ON THE APALACHICOLA.—It is reported that orange-culture is very successful, and is rapidly extending, on both sides of the Apalachicola River, in Liberty and Calhoun Counties, Florida. There are now large numbers of thrifty young orange-groves in that locality, many of them not yet in bearing, but coming forward rapidly. It is claimed that results have already proved both soil and climate to be specially adapted to the production of oranges in Middle Florida. The following are instances of the rate of production reported for the last season: One orchard of 40 trees produced 85,000; 16 of these trees, occupying $\frac{1}{16}$ of an acre, produced 40,000; from another orchard of 60 trees, over 104,000 were shipped; some trees in both these orchards yield, annually, 6,000. From a third orchard of 40 trees 75,000 were shipped; a fourth, of 50, yielded 57,000; and a fifth, of 20, 30,000, the product being estimated as only half an average crop. One grower reports that he realized $900 from six trees; and another, that he realized over $100 from one tree. It is claimed that, as the soil is richer here than on the Saint John's, the trees mature earlier, and bear more fruit than in Eastern or Southern Florida. It is said that $10,000 has been offered for a young orchard of 200 trees not more than four years old.

CO-OPERATION IN THE SALE OF LIVE STOCK.—The *Sangamon County* (Illinois) *Stock and Produce Sale Association* was organized August 1, 1874, by about forty representative farmers of the county. The object of this enterprise is to bring together the producer and consumer of live stock and other farm-products, and to eliminate, as far as possible, the large profits of middlemen, especially in commissions, expenses of shipment, &c. Regular auction-days are designated, and every facility is secured for the sale of animals at reasonable prices, regulated by the association. The membership in October consisted of 118, with numerous additions since. Four monthly sales have been held since the organization, and will be repeated during each month of the year. E. F. Iles is the president, and Charles F. Mills secretary. Both these gentlemen reside in Springfield, Ill.

SHIPMENTS OF BUFFALO-BONES.—Mr. T. F. Oakes, general freight-agent of the Kansas and Pacific Railway, reports to this Department that, in 1874, 3,160,000 pounds of buffalo-bones were shipped over that

road and its connections. Mr. M. L. Sargent, general freight-agent of the Atchison, Topeka and Santa Fé Railroad, reports that, in the same year, buffalo-products were shipped over that road as follows: pounds of bones, 6,914,950; of hides, 1,314,300; of meat, 632,800; and in 1873, of bones, 2,743,100; of hides, 5,180,480; of meat, 1,617,600.

BUTTER-MAKING.—A correspondent in Ashfield, Franklin County, Massachusetts, states that the principal incomes, in that strictly agricultural town, are from butter and beef. The butter is packed in circular boxes, holding about 10 pounds, and costing 11 cents each. It is sent, through "the storekeeper," to commission merchants in Boston. The freight and commission amounts to about 3 cents per pound. In the winter, good lots bring producers 47 cents per pound; the price declines to 33 cents in the summer.

FORAGE IN ARKANSAS.—Our correspondent in Garland County communicates the results of experiments by him in raising pea and corn forage. On a lot of two and a half acres, immediately after taking from it a crop of oats, he sowed and plowed in peas; on two and a half acres of new ground he sowed corn broadcast. The expenses were: Putting in the peas, $12; clearing, fencing, and breaking up the corn lot, $35; gathering and housing both crops, $8.60; total, $55.60. Returns: Seven loads of pea-forage sold, at $10 per load; twenty-eight loads of corn-forage, exchanged for 10,000 feet of fencing stuff, valued at $15 per thousand; sufficient forage reserved for wintering nine head of cattle, estimated at $180; total, $400; gross profits, $344.40. The corn was cut when about waist-high, left in the sun two days, and then housed or stacked. The pea-vines are put in an inclosure, with a tight inclined floor, and 6 inches above that a floor of poles. By trampling the vines, the peas are shelled out, roll down, and are gathered into sacks.

MARKET-PRICES OF FARM-PRODUCTS.

The following quotations represent, as nearly as practicable, the state of the market at the beginning of the month.

Articles.	February.	March.
NEW YORK.		
Flour, superfine State ..... per barrel..	$3 90 to $4 30	$4 25 to $4 75
extra State ..... do.....	4 75 to 5 30	4 80 to 5 25
superfine western ..... do.....	3 90 to 4 30	4 25 to 4 75
extra to choice western ..... do.....	4 65 to 8 00	4 80 to 8 00
common to fair southern extras.. do.....	4 75 to 5 50	4 80 to 5 50
good to choice southern extras.. do.....	5 55 to 8 00	5 55 to 8 00
Wheat, No. 1 spring ..... per bushel..	1 18 to 1 25	1 16 to 1 19
No. 2 spring ..... do.....	1 09 to 1 12	1 09 to 1 14½
winter, red, western ..... do.....	1 20 to 1 27½	1 22 to 1 27
winter, amber, western ..... do.....	1 25 to 1 28	1 22 to 1 27
winter, white, western ..... do.....	1 27 to 1 32	1 25 to 1 34
Rye ..... do.....	91 to 96	84 to 94
Barley ..... do.....	Nominal	1 05 to 1 30
Corn ..... do.....	83 to 84½	80 to 84½
Hay, first quality ..... per ton...	15 00 to 20 00	15 00 to 20 00
second quality ..... do.....	13 00 to 14 00	13 00 to 15 00
Beef, mess ..... per barrel..	9 50 to 10 50	9 50 to 10 50
extra mess ..... do.....	10 50 to 12 00	10 50 to 12 00

Market-prices of farm-products—Continued.

Articles.	February.	March.
NEW YORK—Continued.		
Pork, mess ..... per barel..	——— to $19 75	$19 35 to ———
extra prime ..... do.....	$15 00 to 15 50	14 50 to $15 00
prime mess ..... do.....	18 00 to 18 25	18 00 to ———
Lard ..... per pound..	13¾ to 14	13¾ to ———
Butter, western ..... do.....	16 to 30	16 to 28
State dairy ..... do.....	27 to 40	22 to 40
Cheese, State factory ..... do.....	14 to 16¼	14½ to 16¾
western factory ..... do.....	12 to 15½	12½ to 16½
Cotton, ordinary to good ordinary .... do.....	12¾ to 14⅜	13⅝ to 15⅜
low middling to good middli'g. do.....	14⅞ to 16¼	15⅞ to 17⅛
Sugar, fair to prime refining ..... do.....	7⅜ to 8⅛	7⅝ to 7⅞
Tobacco, lugs ..... do.....	10½ to 13¼	10 to 13
low leaf to medium leaf..... do.....	12¼ to 17	12¼ to 17
Wool, American XXX and picklock.. do.....	60 to 65	60 to 65
American X and XX ..... do.....	52 to 57	52 to 57
American combing ..... do.....	57 to 62	57 to 62
pulled ..... do.....	30 to 45	30 to 45
California, spring-clip ..... do.....	30 to 37	30 to 37
California, fall-clip ..... do.....	17 to 27	17 to 27
BOSTON.		
Flour, western superfine ..... per barrel..	4 00 to 4 50	4 25 to 4 50
common western extras..... do.....	4 75 to 5 00	5 00 to 5 25
red wheats, good to fancy northwestern ..... per barrel..	5 00 to 8 50	5 25 to 8 00
white wheats, good to fancy western ..... per barrel..	5 50 to 7 50	5 50 to 8 50
southern family ..... do.....	6 50 to 8 00	6 50 to 8 00
Corn ..... per bushel..	85½ to 88	87 to 90
Oats ..... do.....	67 to 70	70 to 74
Rye ..... do.....	95 to 1 00	95 to 1 00
Barley ..... do.....	1 20 to 1 95	1 20 to 1 60
Hay, eastern and northern..... per ton...	15 00 to 23 00	22 00 to 23 00
choice western ..... do.....	21 00 to 22 00	21 00 to 22 00
Beef, mess ..... per barrel..	10 50 to 12 00	10 50 to ———
Beef, extra mess ..... per bushel..	12 50 to 14 00	——— to 13 00
family ..... do.....	16 00 to 17 00	16 00 to 17 00
Pork, prime ..... do	17 00 to 17 50	16 00 to 16 50
mess ..... do.....	21 00 to 21 50	20 00 to 20 50
Lard ..... per pound..	14½ to 14¾	14½ to 15
Butter, New York and Vermont ..... do.....	27 to 36	23 to 34
western ..... do.....	20 to 31	18 to 28
Cheese, New York and Vermont factory-do.....	14 to 16½	14½ to 16½
western factory ..... do.....	13½ to 16¼	14 to 16½
Sugar, fair to good refining ..... do.....	7⅞ to 8⅛	7⅝ to 7⅞
Cotton, ordinary to good ordinary .... do.....	12¾ to 15	13½ to 15½
low middling to good middling. do.....	15 to 16½	15¾ to 17
Wool, Ohio and Pennsylvania..... do.....	50 to 60	50 to 60
Michigan ..... do.....	47 to 53	47 to 53
other western ..... do.....	45 to 52	45 to 52
pulled ..... do.....	25 to 55	25 to 55
combing fleece ..... do.....	37 to 65	58 to 65
California ..... do.....	15 to 40	15 to 40
PHILADELPHIA.		
Flour, superfine ..... per barrel..	3 50 to 4 00	3 50 to 3 75
Pennsylvania extra to choice... do.....	4 00 to 5 75	4 00 to 5 75
western extra to choice..... do.....	4 50 to 5 75	5 25 to 6 00
Wheat, white ..... per bushel..	1 25 to 1 32	1 25 to 1 31
amber..... do.....	——— to ———	——— to ———
red ..... do.....	1 15 to 1 18	1 16 to 1 20

Market-prices of farm-products—Continued.

Articles.	February.	March.
PHILADELPHIA—Continued.		
Rye ..... per bushel..	$0 95 to ———	$0 95 to ———
Barley ..... do.....	1 40 to $1 50	1 40 to $1 45
Corn ..... do.....	77 to 79	79 to 81
Oats ..... do.....	62 to 66	66 to 67
Hay, prime baled ..... per ton...	21 00 to 22 00	21 00 to 22 00
baled, common to fair shipping.. do.....	20 00 to 21 00	20 00 to 21 00
Beef, western mess ..... per barrel..	7 00 to 9 00	7 00 to 9 00
extra mess ..... do.....	8 00 to 9 00	8 00 to 9 00
Warthman's city family..... do.....	16 00 to ———	16 00 to ———
Pork, mess..... do.....	19 50 to 20 00	19 50 to 20 00
prime mess..... do.....	17 50 to 18 00	18 50 to 19 00
prime ..... do.....	17 00 to 18 00	17 00 to 18 00
Lard ..... per pound..	13⅝ to 18	13⅞ to 17½
Butter, choice Middle State..... do.....	32 to 40	35 to 40
choice western..... do.....	28 to 31	26 to 30
Cheese, New York factory..... do.....	16 to 17	16 to 17
Ohio factory..... do.....	15 to 16½	15 to 16
Sugar, fair to good refining ..... do.....	7⅛ to 8⅛	7⅝ to 8
Cotton, ordinary to good ordinary.... do.....	12¾ to 14¼	13 to 14⅝
low middling to good middling.. do.....	14¾ to 16¾	15⅛ to 17⅛
Wool, Ohio X and XX ..... do.....	52½ to 57	54 to 56½
other western..... do.....	33½ to 54	49 to 56
tub-washed..... do.....	60 to 62½	54 to 61
pulled..... do.....	35 to 45	46 to 54
combing..... do.....	60 to 65	58 to 66
BALTIMORE.		
Flour, superfine..... per barrel..	4 00 to 4 25	4 00 to 4 25
extra ..... do.....	4 50 to 6 50	4 50 to 6 50
family and fancy ..... do.....	7 00 to 8 50	7 00 to 8 00
Wheat, red..... per bushel..	1 14 to 1 21	1 10 to 1 20
amber ..... do.....	1 20 to 1 22	——— to 1 25
white ..... do.....	1 17 to 1 25	1 10 to 1 25
Rye ..... do.....	95 to 1 00	1 04 to 1 05
Oats..... per bushel..	65 to 69	65 to 70
Corn ..... do.....	76 to 79	79 to 82
Hay, Maryland and Pennsylvania...per ton...	16 00 to 21 00	19 00 to 22 00
Pork, mess ..... per barrel..	19 75 to 20 00	19 75 to ———
extra prime..... do.....	——— to ———	16 to ———
Lard..... per pound..	13¾ to ———	14½ to ———
Butter, western ..... do.....	17 to 32	17 to 32
eastern ..... do.....	22 to 35	22 to 35
Cheese, western factory ..... do.....	14½ to 15½	14½ to 15¾
eastern factory..... do.....	15 to 17	15 to 17
Sugar, fair to good refining ..... do.....	7¾ to 8	7¾ to 8
New Orleans grocery grades...do.....	7¾ to 8½	8¼ to 8½
Tobacco, lugs ..... per cental..	8 00 to 12 00	9 50 to 12 00
common to medium leaf ....do.....	10 00 to 14 50	12 00 to 14 50
Cotton, ordinary to good ordinary..per pound..	14 to 14¾	——— to 14¾
low middling to middling.....do.....	15 to 15⅝	15⅝ to 16
CINCINNATI.		
Flour, superfine..... per barrel..	5 00 to 6 00	3 85 to 4 15
extra ..... do.....	4 65 to 4 90	4 65 to 4 85
family and fancy ..... do.....	4 00 to 4 25	4 95 to 6 40
Wheat, winter red ..... per bushel..	1 08 to 1 12	1 07 to 1 09
hill amber..... do.....	1 10 to 1 16	1 08 to 1 15
white ..... do.....	1 14 to 1 20	1 14 to 1 20
Rye ..... do.....	——— to 1 10	1 11 to 1 12

Market-prices of farm-products—Continued.

Articles.		February.	March.
CINCINNATI—Continued.			
Barley	per bushel	$1 25 to $1 55	$1 15 to $1 32
Corn	do	—— to 68	65 to 66
Oats	do	57 to 62	59 to 63
Hay, baled, No. 1	per ton	21 00 to 22 00	20 00 to 21 00
lower grades	do	14 00 to 19 00	14 00 to 19 00
Beef, plate	per barrel	14 00 to 14 50	14 50 to 15 00
Pork, mess	do	19 00 to 19 25	18 50 to 19 00
Lard	per pound	13¾ to 14½	13½ to 14¼
Butter, choice	do	29 to 30	27 to 28
prime	do	26 to 28	24 to 26
Cheese, prime to choice factory	do	15½ to 16	15½ to 16½
Sugar, New Orleans, fair to good	do	7¾ to 8⅝	7¾ to 8⅝
prime to choice	do	8¾ to 9¼	8¾ to 9¼
Tobacco, lugs	do	12 to 15	12 to 15
leaf	do	25 to 37½	15 to 40
Cotton, ordinary to good ordinary	do	11⅞ to 13⅜	12¼ to 13¾
low middl'g to good middl'g	do	14⅛ to 15¼	14½ to 15¾
Wool, fleece, common to fine	do	43 to 47	43 to 47
tub-washed	do	49 to 52	49 to 52
unwashed, clothing	do	32 to 33	32 to 33
unwashed, combing	do	37 to 38	37 to 38
pulled	do	36 to 38	36 to 38
CHICAGO.			
Flour, choice winter extras	per barrel	5 25 to 6 50	5 25 to 6 50
common to good	do	4 25 to 5 00	4 25 to 5 00
choice spring extras	do	4 50 to 4 75	4 25 to 4 50
patent spring	do	5 00 to 9 00	5 00 to 9 00
spring superfines	do	3 00 to 3 75	3 00 to 3 90
Wheat, No. 1 spring	per bushel	—— to 94⅛	90 to 91
No. 2 spring	do	88 to 90¾	85¾ to 86½
No. 3 spring	do	82¾ to 83	82 to 82¼
Rye, No. 2	do	94 to 97	98 to 99
Barley, No. 2	do	1 23¼ to 1 28	1 13 to 1 15
Oats, No. 2	do	52⅝ to 52⅞	53¾ to 56¾
Hay, timothy	per ton	15 50 to 17 50	17 00 to 18 75
Hay, prairie	per ton	9 50 to 12 50	13 50 to 14 50
Beef, mess	per barrel	8 25 to ——	8 25 to ——
extra mess	do	9 25 to ——	9 25 to ——
Pork, mess	do	18 40 to 18 42½	18 20 to 18 22½
prime mess	do	16 00 to ——	—— to ——
extra prime	do	13 25 to ——	—— to ——
Lard	per pound	13½ to 13⅝	13½ to 13¾
Butter, choice to fancy	do	30 to 37	30 to 36
medium to good	do	23 to 26	23 to 25
Cheese, good prime factory	do	16 to 18	17 to 18
Sugar, New Orleans, com. to choice	do	7 to 9	7 to 8⅞
Wool, tub-washed	do	55 to 57	45 to 58
fleece-washed	do	46 to 48	40 to 50
unwashed	do	27 to 37	27 to 37
pulled	do	42 to 47	42 to 47
SAINT LOUIS.			
Flour, winter, common to choice	per barrel	4 00 to 7 00	4 00 to 7 00
spring	do	4 00 to 5 50	4 00 to 5 50
Wheat, white winter	per bushel	95 to 1 05	95 to 1 05
red winter	do	95 to 1 08	95 to 1 08
spring	do	87 to 98	87 to 98
Corn	do	60 to 70	62 to 71
Rye	do	1 00 to 1 05	1 00 to 1 05

Market-prices of farm-products—Continued.

Articles.	February.	March.
SAINT LOUIS—Continued.		
Barley, per bushel	$1 10 to $1 55	$1 10 to $1 55
Oats, do	53 to 59	55 to 60
Hay, timothy, per ton	19 00 to 22 00	19 00 to 22 00
prairie, do	12 00 to 13 00	12 00 to 13 00
Beef, mess, per barrel	14 00 to 15 00	14 00 to 15 00
Pork, mess, do	18 50 to 18 75	18 50 to 18 75
Lard, per pound	12 to 14	12 to 14
Butter, prime to choice dairy, do	30 to 33	30 to 33
country p'k'd, do	23 to 25	23 to 25
Cheese, Ohio factory, do	13 to 13½	13 to 13½
New York factory, do	13 to 13½	13 to 13½
Wool, tub-washed, do	50 to 54	50 to 54
fleece-washed, do	32 to 52	32 to 52
unwashed, do	28 to 36	28 to 36
NEW ORLEANS.		
Flour, superfine, per barrel	4 75 to ———	4 50 to ———
extra, do	5 00 to 5 75	4 65 to 5 25
choice to fancy, do	5 75 to 6 75	5 50 to 6 25
Corn, yellow, per bushel	——— to 88	——— to 1 05
white, do	86 to 87	——— to 1 02½
Oats, do	71 to 73	71 to 73
Hay, choice, per ton	26 00 to 27 00	30 00 to 31 00
prime, do	24 00 to ———	24 00 to 25 00
Beef, Texas, per barrel	10 50 to 11 50	10 00 to 11 50
western, do	12 00 to 16 00	14 00 to 16 00
Fulton market, per half barrel	11 25 to 11 50	11 40 to 11 50
Pork, mess, per barrel	20 50 to 21 12½	19 00 to 20 00
Lard, per pound	13¾ to 15	14 to 15
Butter, choice Goshen, do	38 to 40	35 to 38
western, do	27 to 30	25 to 28
Cheese, choice western factory, do	16½ to ———	16 to ———
New York cream, do	16½ to 17	18½ to ———
Sugar, fair to fully fair, do	6½ to 7½	6¾ to 7¾
prime to strictly prime, do	7½ to 7¾	8 to 8½
clarified, white and yellow, do	8½ to 9¾	9¼ to 10⅜
Cotton, ordinary to good ordinary, per pound	12½ to 13½	13 to 14½
low middling to good middling, do	14½ to 15½	15 to 16⅜
Wool, lake, do	——— to ———	——— to ———
SAN FRANCISCO.		
Flour, superfine, per barrel	4 00 to 4 50	4 00 to ———
extra, do	4 75 to ———	4 25 to ———
family and fancy, do	5 12 to 5 37½	5 00 to 5 25
Wheat, California, per cental	1 50 to 1 60	1 40 to 1 60
Oregon, do	1 50 to 1 60	1 50 to 1 60
Barley, do	1 45 to 1 70	1 25 to 1 50
Oats, do	1 60 to 1 85	1 60 to 1 85
Corn, white, do	1 50 to 1 55	1 60 to ———
yellow, do	1 45 to 1 50	1 40 to 1 45
Hay, State, per ton	12 00 to 17 00	9 00 to 16 00
Beef, mess, per barrel	8 00 to 8 50	8 00 to 9 00
family mess, per half barrel	6 50 to 8 00	6 50 to 8 00
Pork, mess, per barrel	24 00 to 25 00	22 00 to 23 00
prime mess, do	17 50 to 20 00	17 50 to 19 00
Lard, per pound	13 to 16½	13 to 16½
Butter, overland, do	30 to 40	25 to 50
California, do	40 to 50	30 to 35
Oregon, do	30 to 35	20 to 25

Market-price of farm-products—Continued.

Articles.	February.	March.
SAN FRANCISCO—Continued.		
Cheese ..... per pound..	$0 12½ to $0 16	$0 12½ to $0 16
Wool, native ..... do.....	10 to 20	10 to 20
California ..... do.....	15 to 22	15 to 22
Oregon ..... do.....	18 to 22	18 to 22

LIVE-STOCK MARKETS.

NEW YORK.		
Cattle, extra beeves ..... per cental..	$13 00 to $13 50	$13 00 to $13 75
good to prime ..... do.....	12 00 to 12 75	11 75 to 12 75
common to fair ..... do.....	8 50 to 11 75	9 50 to 11 50
average of the market ..... do.....	10 25 to 11 25	——— to ———
Texans ..... do.....	7 00 to 10 75	7 25 to 8 50
milch-cows ..... per head..	45 00 to 90 00	40 00 to 80 00
veal calves ..... per cental..	7 00 to 10 00	7 50 to 10 50
Sheep, ordinary to extra ..... do.....	5 50 to 8 00	5 37½ to 7 75
Swine ..... do.....	None in market.	None in market.
PHILADELPHIA.		
Cattle, prime beeves ..... per cental..	7 50 to 8 00	7 75 to 8 00
fair to good ..... do.....	5 25 to 7 25	5 50 to 7 25
common ..... do.....	4 00 to 5 00	4 00 to 5 00
Sheep ..... do.....	5 75 to 7 25	4 50 to 7 50
Hogs, corn-fed ..... do.....	9 00 to 10 50	11 00 to 11 50
BALTIMORE.		
Cattle, best beeves ..... per cental..	5 25 to 7 25	5 25 to 7 00
first quality ..... do.....	4 62 to 5 25	4 50 to 5 25
Cattle, medium or good quality... per cental..	3 50 to 4 62	4 00 to 4 50
ordinary ..... do.....	3 00 to 3 50	3 25 to 4 00
general average ..... do.....	4 62 to ———	4 25 to ———
most of the sales ..... do.....	4 00 to 5 50	4 00 to 5 00
milch-cows, fair to good ..... per head..	35 00 to 50 00	30 00 to 50 00
Sheep ..... per cental..	4 50 to 7 00	4 50 to 7 25
Swine, net ..... do.....	8 50 to 9 00	9 50 to 10 25
CINCINNATI.		
Cattle, good to prime butchers' steers ..... per cental..	4 75 to 5 75	5 25 to 6 00
fair to medium ..... do.....	3 50 to 4 50	4 00 to 5 00
common ..... do.....	2 50 to 3 25	2 50 to 3 25
milch-cows ..... per head..	30 00 to 60 00	30 00 to 50 00
calves ..... per cental..	5 50 to 7 00	6 25 to 7 50
Sheep ..... do.....	4 00 to 6 00	4 00 to 6 00
Swine, good to choice ..... do.....	7 20 to 7 50	7 00 to 7 50
common to medium ..... do.....	6 35 to 7 15	6 15 to 6 90
CHICAGO.		
Cattle, extra-graded steers, 1,400 to 1,550 pounds ..... per cental..	6 25 to 6 75	6 25 to 6 65
choice beeves, 1,250 to 1,450 pounds ..... do.....	5 60 to 6 00	5 60 to 6 00
good beeves, 1,150 to 1,300 pounds ..... do.....	5 00 to 5 50	5 00 to 5 50

Live-stock markets—Continued.

Articles.	February.	March.
CHICAGO—Continued.		
Cattle, medium, 1,100 to 1,250 pounds ..... per cental..	$4 25 to $4 75	$4 25 to $4 75
inferior ..... do.....	2 25 to 4 00	2 25 to 4 25
Texans ..... do.....	3 00 to 5 25	2 75 to 5 25
Sheep ..... do.....	3 75 to 5 75	3 50 to 6 00
Swine ..... do.....	6 25 to 7 40	5 75 to 7 30
SAINT LOUIS.		
Cattle, fair to choice native steers. per cental..	4 75 to 6 00	4 75 to 6 00
common to fair natives ..... do.....	3 25 to 4 50	3 25 to 4 50
inferior to common ..... do.....	2 00 to 3 50	2 00 to 3 50
Cattle, Texans, fair to choice ..... do.....	2 50 to 3 50	2 50 to 3 50
Sheep ..... do.....	2 25 to 4 75	2 50 to 5 00
Swine ..... do.....	4 50 to 7 00	5 00 to 7 25
Horses, plugs ..... per head...	40 00 to 75 00	40 00 to 75 00
plain ..... do.....	80 00 to 110 00	80 00 to 110 00
street-car ..... do.....	75 00 to 125 00	75 00 to 125 00
heavy draught ..... do.....	130 00 to 170 00	130 00 to 170 00
good drivers ..... do.....	100 00 to 150 00	100 00 to 150 00
extra ..... do.....	175 00 to 180 00	175 00 to 180 00
Mules, 14 to 15 hands high ..... do.....	75 00 to 120 00	75 00 to 120 00
15 to 16 hands high ..... do.....	120 00 to 180 00	120 00 to 180 00
extra ..... do.....	175 00 to 200 00	175 00 to 200 00
NEW ORLEANS.		
Cattle, Texas beeves, choice ..... per head...	40 00 to 46 00	40 00 to 46 00
first quality ..... do.....	30 00 to 35 00	30 00 to 35 00
second quality ..... do.....	20 00 to 25 00	20 00 to 25 00
western beeves ..... per cental..	4 00 to 6 50	3 00 to 7 50
milch-cows ..... per head..	35 00 to 100 00	35 00 to 100 00
calves ..... do.....	7 00 to 9 00	7 00 to 9 00
Sheep, first quality ..... do.....	4 00 to 5 00	6 00 to 7 00
second quality ..... do.....	3 00 to 4 00	3 00 to 4 00
Swine ..... per cental..	5 00 to 8 00	5 00 to 8 50

FOREIGN MARKETS.

WHEAT.—January, in England, was warm and damp, but February closed with heavy storms of snow and sleet, with severe frosts. This closing type of winter prevailed over Northern Europe generally. In some regions the absence of snow was regarded with apprehension as exposing the winter-grain to injury from frost. Spring planting was consequently delayed, and many of the lowland districts were helplessly swamped. The season, thus far, has baffled the calculations of the most experienced and weather-wise, but British farmers were hopeful that this rough opening of the vegetative season would be succeeded by more genial growing weather in March and April.

An advance in the wheat and flour market was noticeable in Western Europe, though the rise has not generally been of much moment. Belgium and Holland had passed their ebb-tide, while in Germany prices had improved. In Hungary, copious snow-fall protected the wheat-crop. The weekly transactions in England had increased over those of

1874. Sales of English wheat during the last week in February amounted to 59,094 quarters, averaged at 41*s.* 6*d.*, against 53,964 quarters at 62*s.* 10*d.* during the corresponding week of last year. The London averages were 44*s.* 1*d.* upon 3,584 quarters. The imports into the United Kingdom during the third week in February were 479,083 cwts. The last week in February opened upon moderate supplies of English wheat in Mark Lane, with fair arrivals of foreign, of which about a third were from Odessa and the remainder mostly from New York and San Francisco. In Paris, growers demanded from 39*s.* to 44*s.* per quarter. The wheat-trade of the French provinces was quite firm, showing an advance of 6*d.* to 1*s.* per quarter. The Marseilles market had subsided into calmness after large sales. The Belgium trade was firm, while in Frankfort the cold weather, unaccompanied by snow, made holders indifferent in offering.

In Mark Lane, London, Essex, and Kent, white commanded 44*s.* to 49*s.*; ditto, red, 42*s.* to 44*s.*; Norfolk, Lincolnshire, and Yorkshire red, 42*s.* to 44*s.* Of foreign wheats, Dantzic mixed was quoted at 50*s.* to 54*s.* per quarter; Konigsberg, 46*s.* to 53*s.*; Rostock, 44*s.* to 48*s.*; Silesian red, 43*s.* to 49*s.*; Pomeranian, Mecklenberg, and Uckermark red, 44*s.* to 46*s.*; Ghirka, 41*s.* to 42*s.*; Russian hard, 40*s.* to 43*s.*; Saxonska, 43*s.* to 45*s.*; Danish and Holstein red, 41*s.* to 47*s.*; American red, 40*s.* to 42*s.*; Chilian white, 49*s.*; California, 50*s.*; Australian, 50*s.* to 51*s.*

In Liverpool, Canadian white brought 9*s.* 1*d.* to 10*s.* per cental; American white, 9*s.* 6*d.* to 10*s.*; American red, winter, 9*s.* 2*d.* to 9*s.* 5*d.*; spring No. 1, 8*s.* 10*d.* to 9*s.*; spring No. 2, 8*s.* 4*d.* to 8*s.* 8*d.*; Californian, 9*s.* 1*d.* to 9*s.* 10*d.*; Oregon, 9*s.* 10*d.* to 10*s.*; Chilian, 8*s.* 10*d.* to 8*s.* 11*d.*

At Odessa, foreign advices being very discouraging, inferior kinds were rapidly put upon the market at rates advantageous to buyers.

Flour.—The imports, during the third week in February, into the United Kingdom, amounted to 132,615 cwts. The fourth week opened in good supplies of English, with fair arrivals of American in barrels. In Mark Lane, the best town households brought 36*s.* to 40*s.* per 280 pounds; best country households, 30*s.* to 31*s.*; Norfolk and Suffolk, 27*s.* to 29*s.*; American, per barrel, 21*s.* to 25*s.* In Liverpool, English and Irish superfines were quoted at 31*s.* to 35*s.* per 280 pounds; extra, 35*s.* 6*d.* to 40*s.*; French, 37*s.* to 45*s.*; Trieste, 48*s.* to 60*s.*; Spanish, 38*s.* to 39*s.*; Chilian, 31*s.* 6*d.* to 35*s.*; Californian, 36*s.* to 37*s.* 6*d.*; American, Western State and extra, 21*s.* to 23*s.* per barrel; Baltimore and Philadelphia, 21*s.* to 23*s.*; Ohio and extra, 22*s.* to 28*s.*; Canadian, 21*s.* to 26*s.* In Paris, the best flour was sold for consumption at 30*s.* 1*d.* to 34*s.* per 280 pounds.

Maize.—In Mark Lane, white was sold at 39*s.* to 40*s.* per quarter; yellow at 34*s.* to 36*s.* At Liverpool, new American brought 36*s.* to 36*s.* 6*d.* per 280 pounds; Galatz, 37*s.* 6*d.* to 38*s.* Large supplies of American had been received in London, yet the market had advanced 6*d.* per quarter.

GRAIN-TRADE OF ODESSA DURING 1874.

The annual *Bulletin du Marché des produits Agricoles* for 1874, issued by N. Willenz and Simon Bernstein, *Courtiers jurés*, states that the spring and summer of the year lately ended were times of only suffering and losses. The stagnation of business in foreign countries and the enormous decline in the values of grain shook the financial position

of many of the exporters at this point; but the rally of prices in autumn and the resumption of active movement have given satisfactory results. Experience has shown an important fact that, in spite of the abundance of the crops, prices fell only to a certain limit. The London speculators hoped to purchase at their own prices, but when the market touched 38*s.* per quarter there was a speedy reaction to 40*s.* 6*d.* The crops in the immediate vicinity of Odessa were, as last year, total failures.

Transactions in wool were about on the same scale as in 1873. Purchases of fine wool in grease were made partly for France and partly for Russia, at 8 to 9¼ roubles per *poud*, (15½ to 18 cents per pound.) French and Russian speculators declined to bid against agents of Austrian factories for fine washed wools, at 24 to 27½ roubles per *poud*, (46½ to 53½ cents per pound.)

Other shipping points on the Black Sea have entered into competition with Odessa. Nicolaieff has extended its sphere of operations, and Sevastopol, profiting by its natural advantages for maritime enterprize, has also entered the lists. Königsberg, in Prussia, by its railway connections, has also trenched upon a portion of the field of production hitherto marketed at Odessa. These, however, can but very little affect the main sources of supply of the Odessa trade. It is expected that the gigantic grain-producing interest of Russia will build up numerous commercial centers and primary markets. But in order to maintain her ancient prestige, Odessa must erect new buildings, enlarge her accommodations, and reduce the cost of handling grain. The railroad and navigation companies centering in the city are called upon to reduce their charges of transportation to the lowest practicable limit. The controlling authorities of these lines are credited with too much sagacity to kill the goose that lays their golden egg.

Exchanges were less fluctuating than in 1873; the English pound sterling varied from 7.29 roubles to 7.15 roubles. In French exchanges the rouble has varied from 3.46 francs to 3.52½ francs. This increasing steadiness is hailed with especial satisfaction as foreshadowing a normal and permanent relation with foreign markets. The improved condition of the imperial finances is shown by the reduced premium on gold as compared with the Russian paper currency. This premium is still too great.

The following tables will give a summary of the transactions of the last three years:

Cereals purchased and placed in warehouse.	1872.		1873.		1874.	
	Quantity.	Price in roubles.†	Quantity.	Price in roubles.†	Quantity.	Price in roubles.†
Soft wheat, tchetverts*	733,500	7.55 to 12.62½	330,300	9.55 to 14.62½	621,400	5.25 to 14.75
Sandomirca.....do....	87,300	9.70 to 12.50	38,000	9.75 to 14.00	109,100	7.25 to 14.12½
Ghirka.....do....	1,363,100	8.25 to 13.05	712,000	9.50 to 15.00	261,100	6.75 to 15.00
Do.....pouds..	749,300	‡0.82 to 1.26	733,500	‡1.12 to 1.40	939,900	‡0.69 to 1.43
Hard wheat, tchetverts	6,900	8.50 to 10.75	1,400	13.00 to 14.00	3,900	10.65 to 12.50
Rye.....do....	308,500	4.25 to 6.62½	194,700	5.30 to 8.29	252,900	4.45 to 7.60
Maize.....do....	47,300	5.25 to 6.62½	419,200	5.45 to 8.50	11,400	7.62½ to 8.00
Barley.....do....	92,600	3.80 to 4.55	35,300	4.25 to 6.25	82,900	4.50 to 6.60
Oats.....do....	.....	.....	2,800	3.40 to ——	28,600	4.50 to 5.75
Flaxseed.....do....	40,900	11.95 to 13.80	35,400	11.50 to 13.62½	33,500	10.50 to 13.25
Rapeseed.....do....	22,700	4.00 to 6.12½	9,700	4.12½ to 6.87	36,700	4.50 to 6.00
Colza.....do....	2,600	10.75 to 11.50	9,700	10.50 to 11.62½	7,800	9.62½ to 11.65

*A tchetvert is equal to 5.5205 bushels.

†A rouble varies, according to date of coinage, from 73 to 80 cents.

‡The prices are here stated by pouds; a poud is equal to 36.1050 pounds, and a tchetvert to about 9.59 pouds.

The total receipts amounted to 2,359,200 tchetverts against 2,582,000 tchetverts in 1873, and 3,454,700 tchetverts in 1872. The decline of the last two years is attributable in part to the short crops of the regions marketing their grain at Odessa and partly to the growth of rival wheat-markets. The above tables do not embrace the receipts from neighboring farmers which pass, without the interposition of speculators, directly into the hands of the exporters.

The stocks of grains and seeds remaining in warehouse December 31, 1872, 1873, and 1874 were as follows:

	Soft wheat.	Sandomirca.	Ghirka.	Hard wheat.	Rye.	Maize.
	Tchetverts.	*Tchetverts.*	*Tchetverts.*	*Tchetverts.*	*Tchetverts.*	*Tchetverts.*
1872	140,000	30,500	698,000	135,000	171,000	53,500
1873	346,000	95,000	350,000	6,000	40,000	11,000
1874	514,000	73,500	383,000	8,000	28,000	4,000

	Barley.	Oats.	Flaxseed.	Rapeseed.	Colza.	Pease.
	Tchetverts.	*Tchetverts.*	*Tchetverts.*	*Tchetverts.*	*Tchetverts.*	*Tchetverts.*
1872	46,000	14,500	13,000	8,000	3,000	3,500
1873	13,000	11,000	11,000	11,000	9,000	1,400
1874	26,000	3,500	3,500	5,000	1,500	.....

The total amount of grains and seeds on hand at the close of the last three years was as follows: 1872, 1,194,500 tchetverts; 1873, 904,400 tchetverts; 1874, 1,030,000 tchetverts.

The export trade will be presented in a future report, and will be reproduced in a future monthly report of this Department.